

THE ISOPODS OF KARTABO<sup>1</sup>\*  
BARTICA DISTRICT, BRITISH GUIANA

BY WILLARD G. VAN NAME

(Plates VII–XXVI incl.)

The American Museum of Natural History has received from William Beebe, Director of the New York Zoological Society's Tropical Research Station at Kartabo, British Guiana, a number of Crustacea of various groups collected in the course of the investigation of the fauna of the immediate vicinity of the Station. The Isopoda collected, comprising fourteen species and several additional specimens so immature that their certain determination is difficult, are described in the following pages. The collection is of special interest, as no less than six of them appear to be new to science, and because comparatively little has been recorded regarding the isopods of that part of South America, although it doubtless has a large representation of both land and aquatic isopods.

The following Isopoda are comprised in the collection:

Suborder CHELIFERA

Family TANAIIDAE

*Nototanais beebei*, sp. nov.

Suborder FLABELLIFERA

Family EXCORALLANIDAE

\**Excorallana berbicensis* Boone, 1918.

Family CYMOTHOIDAE

*Livoneca symmetrica*, sp. nov.

*Livoneca guianensis*, sp. nov.

*Telotha henselii* (von Martens), 1869.

Suborder EPICARIDEA

Family BOPYRIDAE

*Probopyrus bithynis* Richardson, 1904.

Suborder ONISCOIDEA

Family ONISCIDAE

Subfamily EUBELINAE

\**Ethelum americanum* (Dollfus), 1896.

<sup>1</sup> Contribution from the Laboratory of the Department of Lower Invertebrates of the American Museum of Natural History, New York.

\* Contribution, Department Tropical Research No. 194.

## Subfamily ONISCINAE

*Leptotrichus pittieri* Pearse, 1921.

\**Circoniscus gaigei* Pearse, 1917.

\**Philoscia nitida*<sup>2</sup> (Miers), 1877.

*Philoscia maculata*<sup>2</sup> Budde-Lund, 1885.

***Philoscia demerarae*** sp. nov.

***Pentoniscus exilis***, sp. nov.

## Family LIGYDIDAE

***Ligyda platycephala*** sp. nov.

Those of the above that have already been recorded from any part of Guiana (including the British, Dutch and French possessions) are indicated by an asterisk. The entire list of Isopoda hitherto recorded from that region comprises, as far as I am aware, only the following twenty-two species, eleven of which have been definitely credited to British Guiana. (See "Bibliography" at end of this article.) The present article raises these numbers to thirty-two from the whole of Guiana and twenty-two from British Guiana.

## ISOPODS ALREADY RECORDED FROM GUIANA.

## Suborder FLABELLIFERA

## Family EXCORALLANIDAE

*Excorallana berbicensis* Boone, 1918.

*Excorallana berbicensis* Boone, 1918, *Proc. U. S. Nat. Mus.*, LIV, p. 594 pl. XCII, fig. 1.

*Locality*.—Rio Berbice, British Guiana.

Represented also in the present collection from Kartabo.

## Family CYMOTHOIDAE

*Livoneca redmanni* Leach, 1818.

*Livoneca redmanni* + *L. desmarestii* Leach, 1818, *Dict. Hist. Nat.* XII, p. 352; Desmarest, 1825, *Con. gen. Crust.*, p. 308; Milne-Edwards, 1840, *Hist. Nat. Crust.*, III, p. 261; also in Cuvier, *Regn. Anim.* III, pl. LXVI, figs. 3-3e, 4-4a.

*Livoneca redmanni* Schioedte and Meinert (part), 1884, *Nat. Tidsskr.* (3) XIV, p. 353, pl. XIV, figs. 6-12; Richardson, 1900, *Amer. Naturalist*, XXXIV, p. 221; 1901, *Proc. U. S. Nat. Mus.*, XXIII, p. 531; 1905, *Bull.* 54, *U. S. Nat. Mus.*, p. 261, figs. 274, 275.

*Locality*.—Guiana (Schioedte and Meinert); also West Indies and Brazil

## Suborder ONISCOIDEA

## Family ONISCIDAE

*Philoscia spinosa*, Say, 1818.

*Philoscia spinosa* Say, 1818, *Journ. Acad. Nat. Sci. Philadelphia*, I, p.

<sup>2</sup> Identification somewhat uncertain owing to the insufficient description.

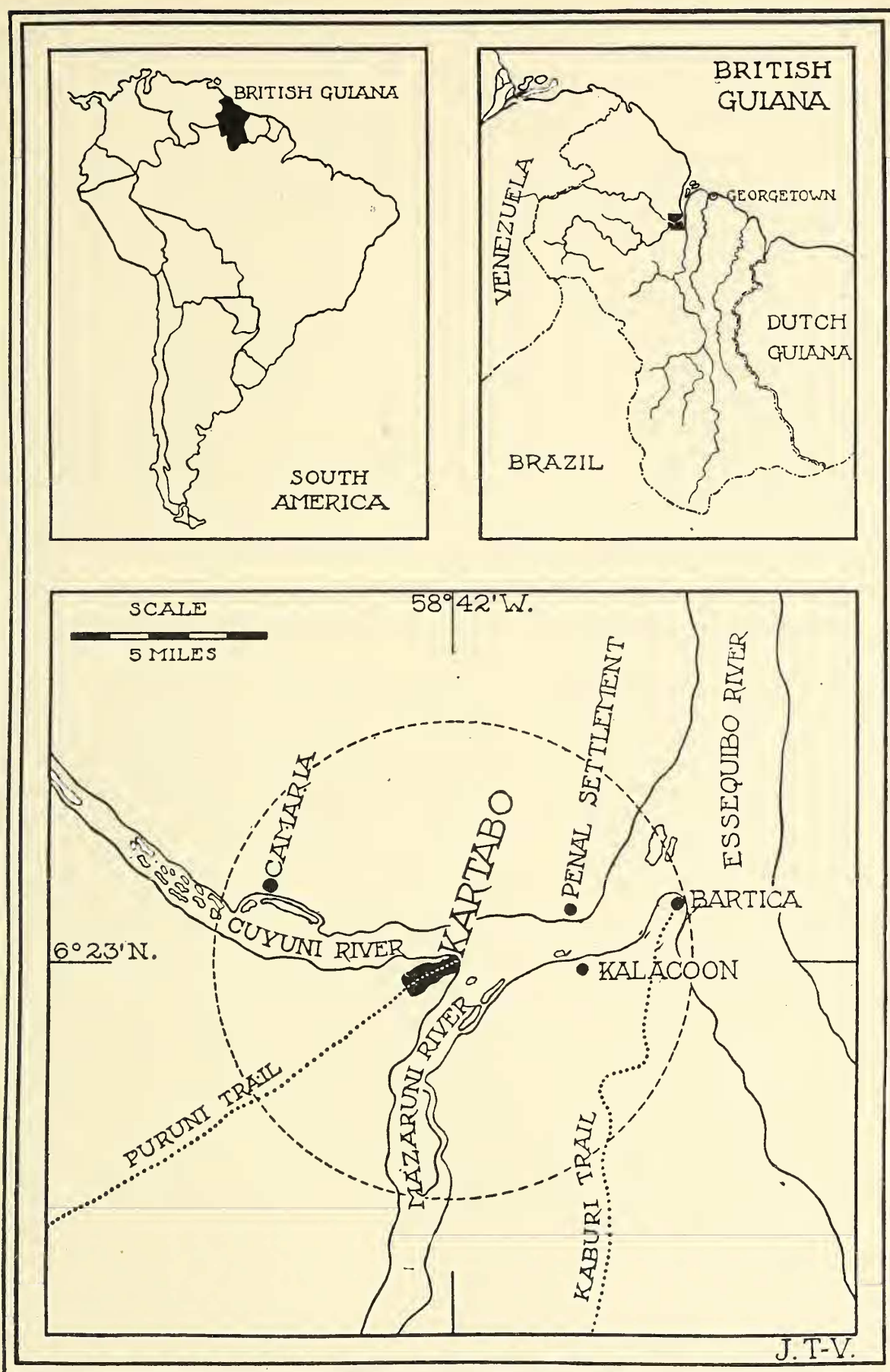


Plate A. British Guiana Tropical Research Station of the New York Zoological Society.  
Circle represents a radius of six miles.

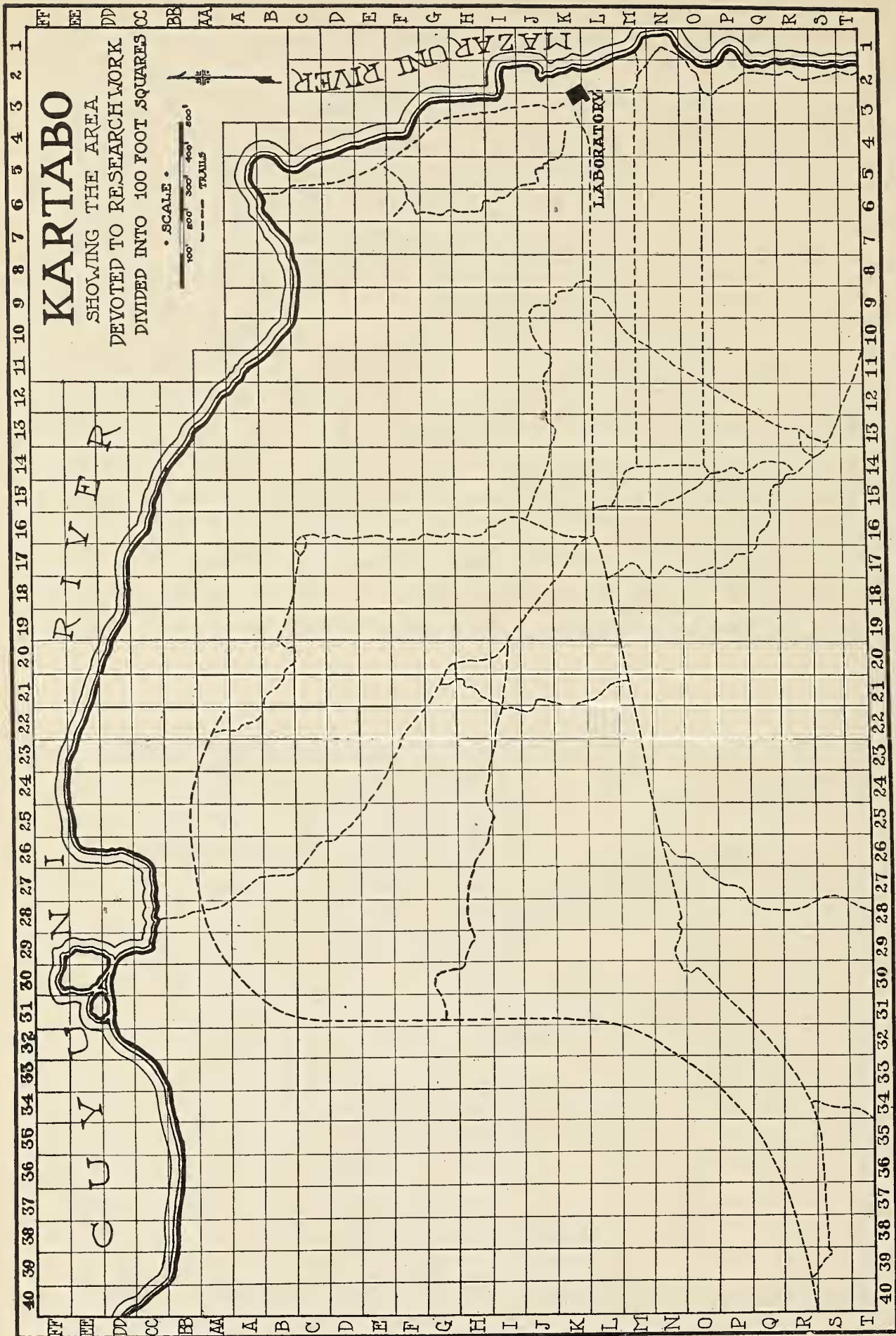


Plate B. Area devoted to research at Kartabo.  
Drawing by John Tee-Van.

429; Pearse, 1917, *Occ. Papers Mus. Zool. Univ. Michigan*, No. 46, p. 7.  
For other references, see Richardson, 1905, p. 608, and Budde-Lund, 1885, p. 223.

*Locality*.—Savannah, Georgia (Say, 1818); Dunoon, British Guiana, "from wet rotten logs in clay jungle, and rotten wood on ground in the Labba Creek sandhills" (Pearse, 1917).

*Philoscia olfersii* Brandt, 1833.

*Philoscia olfersii* Brandt, 1833, *Consp. Monogr. Crust. Onisc.*, p. 21;  
Budde-Lund, 1885, *Crust. Isop. Terr.*, p. 212; Pearse, 1917, *Occ. Papers, Mus. Zool. Univ. Michigan*, No. 46, p. 7.

For other references see Budde-Lund, 1885.

*Locality*.—Brazil (Brandt); Dunoon, British Guiana. "In wet rotten logs and under fallen leaves" (Pearse, 1917).

*Philoscia nitida* (Miers), 1877.

*Philougria nitida* Miers, 1877, *Proc. Zool. Soc. London*, ann. 1877, p. 670, pl. LXIX, figs. 3-3b.

*Philoscia nitida* Pearse, 1915, *Proc. U. S. Nat. Mus.*, LXIX, p. 542.

*Locality*.—"Peru; Guiana. The specimens from Guiana generally appear rather more coarsely granulated" (Miers, 1877). Santa Marta region, Colombia (Pearse, 1915). "This was an abundant species in the forest from 'La Rosa' to the top of San Lorenzo [8000 feet]. It was usually found on the ground among leaves or under logs, but was also taken on tree trunks, in brooks and in bromeliads. At the top of San Lorenzo it was found in the ground under leaves and in a little brook that started there. Those taken at high altitudes are darker in color in alcohol" (Pearse, 1915).

Specimens in the present collection from Kartabo appear to belong to this species.

*Porcellionides brunneus* (Brandt), 1833.

*Procellio brunneus* Brandt, 1833, *Bull. Soc. Imp. Nat. Moscou*, VI, p. 176.

Milne Edwards, 1840, *Hist. Nat. Crust.*, III, p. 172. Stuxberg, 1875, *Ofvers. k. svensk. Vetensk. Akad. Forh.*, XXXII, No. 2, p. 43.

*Metoponorthus brunneus* Budde-Lund, 1885, *Crust. Isop. Terr.*, p. 171.

*Locality*.—Demerara.

*Porcellionides pruinosus* (Brandt), 1833.

? *Porcellio* (*Porcellionides*) *jelskii* Miers, 1877, *Proc. Zool. Soc. London*, 1877, p. 668, pl. LXVIII, figs. 3-3b.

*Porcellio* (*Porcellionides*) *flavorittatus* Miers, 1877, *Proc. Zool. Soc. London*, 1877, p. 669, pl. LXVIII, figs. 4-4b.

*Metoponorthus pruinosus* Budde-Lund, 1885, *Crust. Isop. Terr.*, p. 169; Richardson, 1901, *Proc. U. S. Nat. Mus.*, XXIII, p. 569; 1905, *Bull. 54, U. S. Nat. Mus.*, p. 627, fig. 674.

See Budde-Lund, 1885, and Richardson, 1905, for synonyms.

*Localities*.—Cayenne (*P. flavo-vittata* Miers, 1877); Peru and Guiana (*P. jelskii* Miers, 1877). This species is of practically world-wide distribution.

*Porcellionides jelskii* (Miers), 1877.

*Porcellio* (*Porcellionides*) *jelskii* Miers, 1877, *Proc. Zool. Soc. London*, 1877, p. 668, pl. LXVIII, figs. 3-3b.

Richardson (1905, p. 621) makes this a doubtful synonym of *P. pruinosus* (see above).

*Porcellio cayennensis* Miers, 1877.

*Porcellio cayennensis* Miers, 1877, *Proc. Zool. Soc. London*, 1877, p. 667, pl. LXVIII, figs. 2-2b.

*Locality*.—Cayenne.

*Lyprobius cristatus* (Dollfus), 1889.

*Porcellio cristatus* Dollfus, 1889, *Notes Leyden Mus.*, XI, p. 91, pl. V, figs. 2-2d.

*Lyprobius cristatus* Budde-Lund, 1893, *Ent. Meddel.*, ann. 1893, p. 127; Dollfus, 1892, *Ann. Soc. Ent. France*, LXII, p. 345.

*Locality*.—Surinam (Dollfus); Caracas, Venezuela (Budde-Lund).

*Leptotrichus emarginatus* Pearse, 1917.

*Leptotrichus emarginatus* Pearse, 1917, *Occ. Papers Zool. Mus. Univ. Michigan*, No. 46, p. 5.

*Locality*.—Dunoon, British Guiana. Taken under bark of trees, in axils of leaves three to ten feet from the ground, and also in loose sand (Pearse).

*Cubaris murina* Brandt, 1833.

*Cubaris murina* + *C. brunnea* Brandt, 1833, *Bull. Soc. Imp. Nat. Moscou*, VI, p. 28.

*Armadillo murinus* + *A. brunneus* Milne-Edwards, 1840, *Hist. Nat. Crust.*, III, p. 179.

*Cubaris murinus* + *C. brunneus* Stuxberg, 1875, *Öfvers. k. svensk. Vetensk.-Ak. Forh.* XXXII, No. 2, p. 44 (foot-note).

*Cubaris affinis* Miers, 1877 (non Dana, 1854), *Proc. Zool., Soc. London*, ann. 1877, p. 666, pl. LXVII, figs. 4-4b.

*Armadillo murinus* Budde-Lund, 1879, *Prosp. Isop. Terr.*, p. 7; 1885, *Crust. Isop. Terr.*, p. 27; 1904, *Rev. Crust. Isop. Terr.*, part III, p. 119.

*Cubaris murina* Richardson, 1901, *Proc. U. S. Nat. Mus.*, XXIII, p. 571; 1905, *Bull.* 54, *U. S. Nat. Mus.*, p. 645, figs. 687-689.

See Budde-Lund, 1885, and Richardson, 1905, for other synonyms.

*Localities*.—Demerara (Brandt, 1833); Cayenne (Miers, 1877). Widely distributed in the tropics.

*Cubaris gaigei* Pearse, 1917.

*Cubaris gaigei* Pearse, 1917, *Occ. Papers Zool. Mus. Univ. Michigan*, No. 46, p. 2, fig. 1.

*Locality*.—Dunoon, British Guiana. In rotten logs and under dead leaves on the ground, and on trees under loose bark, among bromeliads, etc. (Pearse)

*Sphaeroniscus portoricensis* Richardson, 1901.

*Sphaeroniscus portoricensis* Richardson, 1901, *Proc. U. S. Nat. Mus.*, XXIII, p. 573, fig. 34; 1905, *Bull.* 54, *U. S. Nat. Mus.*, p. 662, figs. 703, 704.

Pearse, 1917, *Occ. Papers Zool. Mus. Univ. Michigan*, No. 46, p. 3.

*Locality*.—Dunoon, British Guiana, on sand hills and in an abandoned termite nest (Pearse); El Yunque, Porto Rico (Richardson).

*Circoniscus spinosus* (Collinge), 1918.

*Paracubaris spinosus* Collinge, *Journ. Linn. Soc. London, Zool.*, XXXIV, p. 61, pl. VI.

*Locality*.—Mazakuri River, British Guiana, in decaying wood.

Though made the type of a new genus (*Paracubaris*) by Collinge, this

species is apparently hardly separable generically from *Circoniscus* Pearse, 1917, to which I am accordingly referring it.

*Circoniscus gaigei* Pearse, 1917.

*Circoniscus gaigei* Pearse, 1917, *Occ. Papers Mus. Zool. Univ. Michigan*, No. 46, p. 4, fig. 2.

*Locality*.—Dunoon, British Guiana, in rotten logs, under bark of trees, etc. (Pearse).

Represented also in the present collection from Kartabo.

*Eluma caelatum* (Miers), 1877.

*Armadillidium caelatum* Miers, 1877, *Proc. Zool. Soc. London*, 1877, p. 665, pl. LXVII, figs. 3–3b.

*Eluma purpurascens* Budde-Lund, 1879, *Pros. Isop. Terr.*, p. 6; 1885, *Crust. Isop. Terr.*, p. 48., Dollfus, 1896, *C.-R. 3me Congres. Int. Zool. Leyden*, p. 357.

*Eluma caelatum* Collinge, 1917, *Check-list British Terr. Isop.*, p. 115; 1922, *Journ. Linn. Soc. London, Zool.*, XXXV, p. 105, pl. VIII.

See Collinge, 1922, for synonyms and discussion.

*Locality*.—Cayenne (Miers, 1877; Budde-Lund, 1885; Dollfus, 1896). Also in Spain, Algeria, Madeira, etc. This species is the type of the genus *Eluma*, established for it by Budde-Lund (1885, p. 48).

*Armadillidium vulgare* (Latreille), 1804.

*Armadillo vulgaris* Miers, 1877, *Proc. Zool. Soc. London*, 1877, p. 665.

*Armadillidium vulgare* Budde-Lund, 1885, *Crust. Isop. Terr.*, p. 66;

Richardson, 1905, *Bull.* 54, *U. S. Nat. Mus.*, p. 666, fig. 706.

See Budde-Lunde, 1885, and Richardson, 1905, for synonyms.

*Locality*.—Cayenne (Miers), 1877. This locality was given doubtfully by Miers, but does not seem unlikely, as the species is almost cosmopolitan.

*Ethelum americanum* (Dollfus), 1895.

*Mesarmadillo americanus* Dollfus, 1896, *Proc. Zool. Soc. London*, 1896 pp. 397, 398.

*Ethelum americanum* Pearse, 1917, *Occ. Papers Mus. Zool. Univ. Michigan*, No. 46, p. 1.

For other references see descriptive part of this paper.

*Locality*.—St. Vincent, W. I. (Dollfus); Dunoon, British Guiana. On trees among bromeliad roots, vines, etc. (Pearse, 1917). Represented also in the present collection from Kartabo.

## Family LIGYDIDAE

*Ligyda exotica* (Roux), 1828.

*Ligia exotica* Roux, 1828, *Crust. Medit.*, p. 3, pl. XIII, fig. 9; Richardson, 1902, *Trans. Conn. Acad. Sci.*, XI, p. 306.

*Ligia baudiniana* ? (non Milne-Edwards, 1840) Miers, 1877, *Proc. Zool. Soc. London*, ann. 1877, p. 670.

*Ligyda exotica* Richardson, 1905, *Bull.* 54, *U. S. Nat. Mus.*, p. 676, figs. 716–718; Van Name, 1918, *Bull. Amer. Mus. Nat. Hist.*, XLIII, p. 72, figs. 27–30.

See Van Name, 1918, for synonyms.

This species is found on the shores of most tropical regions of both hemi-

spheres. Richardson (1902) points out that the descriptions of the specimens from "Cayenne" doubtfully assigned by Miers, 1877, to *L. baudiniana*, agree somewhat better with the present species. In a later work (1905) however, she omits Cayenne from the localities given for *L. exotica*, though she credits *L. baudiniana* to that locality. It is likely that both species occur in Guiana.

*Ligyda baudiniana* (Milne-Edwards), 1840.

*Ligia baudiniana* Milne-Edwards, 1840, *Hist. Nat. Crust.*, III, p. 155.

*Ligia gracilis* Moore, 1902, *Bull. U. S. Comm. Fish and Fisheries*, XX, pt. 2, p. 175, pl. XI, figs. 7-12.

*Ligyda baudiniana* Richardson, 1905, *Bull.* 54, *U. S. Nat. Mus.*, p. 678, figs. 719-723.

See Richardson, 1905, for synonyms.

*Locality*.—Cayenne, Miers, 1877 (?); Richardson, 1905, See remarks under *L. exotica*.

*Ligyda cajennensis* (Koch), 1847.

*Ligia cajennensis* Koch, 1847, *Syst. Myriapod.*, p. 212, pl. IX, fig. 102;

Budde-Lund, 1885, *Crust. Isop. Terr.*, p. 271; Jackson, 1922, *Proc. Zool. Soc. London*, 1922, pp. 698, 701.

*Ligia cajennensis* Stuxberg, 1875, *Öfvers. k. svensk. Vetensk.-Ak. Forh.*, XXXII, No. 2, p. 43.

*Locality*.—Cayenne.

Of the fourteen species of isopods collected at Kartabo, six are aquatic and eight are terrestrial forms. Although the water of the rivers is entirely fresh at that point, the close relationship of the aquatic forms to marine species is worthy of note. *Nototanais beebei* fits fairly well into a genus of the sub-antarctic seas, several species having been described from that region of the world, of which *N. dimorphus* (Beddard), 1886, (syns. *Paratanais d.* Beddard 1886, *Rep. Voy. Challenger*, Zool., XVII, p. 130, Pl. XVII, figs. 1-8; *Nototanais australis* Richardson, *Exped. Ant. Franç.*, 1903-1905, *Isopodes*, Mém. 2, p. 1 fig. 1; *Nototanais d.* Vanhoeffen, *Deutsch. Südpol.-Exped.*, XV, p. 470) seems to be the closest to *N. beebei*. It was originally collected by the *Challenger* Expedition off Kerguelen Island in rather deep water, and has been since found in other sub-antarctic localities.

*Excorallana* and *Livoneca* are genera whose species are mainly marine; they are predaceous forms that attach themselves to fishes, which has no doubt contributed toward the extension into fresh water of certain of their species. *Telotha* is represented by two species in South American rivers, but is very closely related to, and perhaps derived from the same immediate ancestors as *Cymothoa*, widely distributed in the sea. This genus is likewise parasitic on fishes. The remaining aquatic genus, *Probopyrus*, is also unquestionably one of marine origin, some of its species being parasites on strictly marine species of shrimps.

Moreover one of the terrestrial forms (*Ligyda*) belongs to a genus whose most familiar species are inhabitants of the sea coasts, living on wet rocks piles of wharves, etc. at the water's edge, but in this case we may feel uncertain as to whether such littoral habits are not merely a recent acquirement of certain species.

## DESCRIPTIONS OF SPECIES

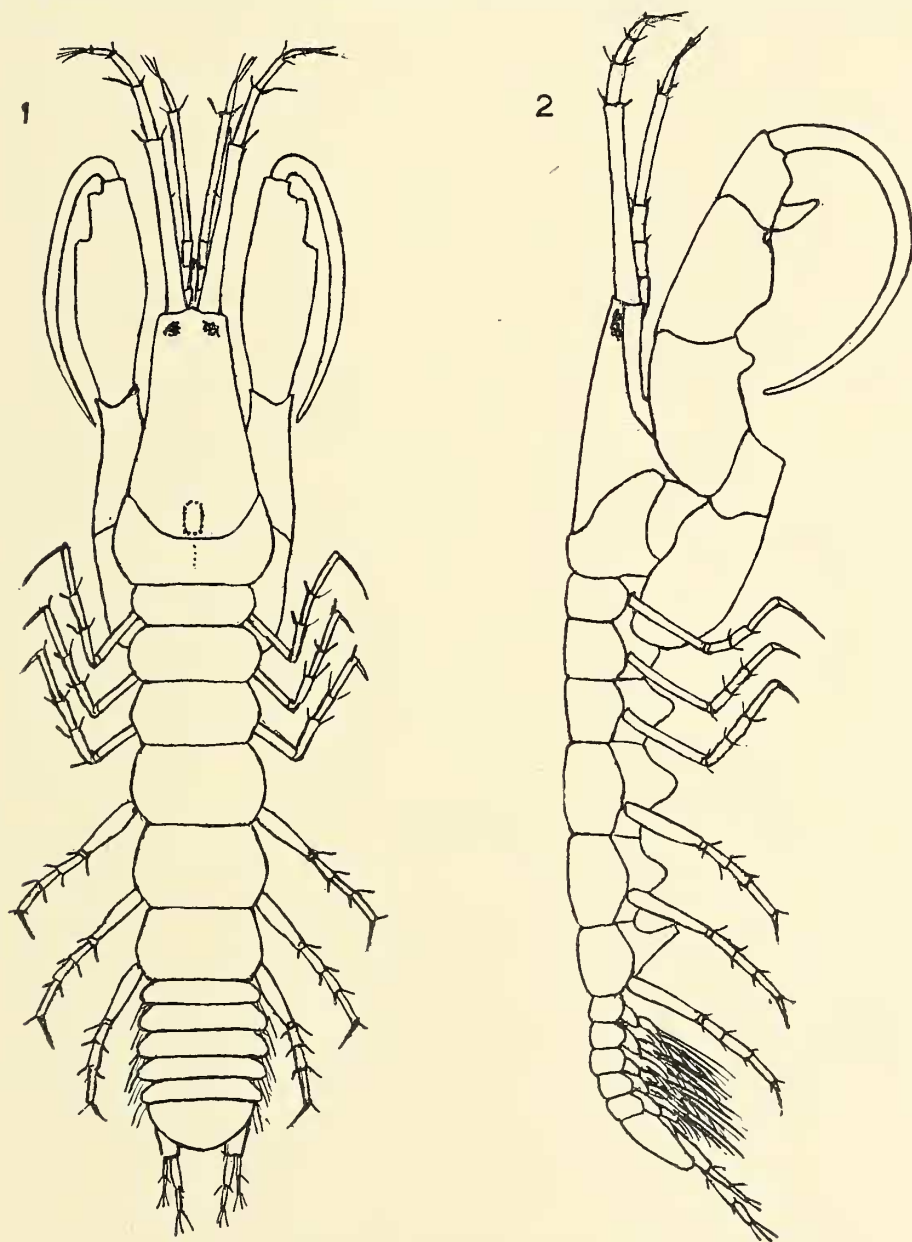
## Suborder CHELIFERA

## Family TANAIIDAE

***Nototanaïs beebei*, sp. nov.**

(Plate VII, figs. 1-2)

Five specimens of this species were collected; three of them are in a very poor condition for study, as they are rolled up in a small circle (the dorsal surface outside), the large chelae being extended out at right angles, showing a degree of mobility in these limbs which one would hardly expect from their compact articulation. The other two specimens are straightened out, or nearly so, and the following description and figures have been based chiefly on these two. All

Plate VII.—1-2, *Nototanaïs beebei*, sp. nov.   × about 40.

the five specimens are apparently males, and we may expect the females to have smaller and simpler chelae and probably but three segments in the first antennae.

Body elongate; the average width is contained six or seven times in the length. Back flattened, the segments being only slightly arched from side to side. All the segments are free and separately movable except the first thoracic segment, which is immovably united with the head. The specimens do not vary greatly in size; the largest do not much exceed 2 mm. in length. The alcoholic specimens are of the usual yellowish color.

Head very elongate (over one-quarter of the total body length), its posterior end wide and rounded, and deeply set back into the first thoracic segment; its sides converge gradually toward the rather narrow front end, which is truncate and has a slight median projection. Eyes represented by two pigmented areas on the upper surface at the extreme front end of the head. First antennae stout, of five segments; the basal one being very long, the terminal one minute; second antennae smaller and shorter, also of five segments, the three first short, the fourth very long; the second segment bearing a spine or scale on the median side at its distal end. The upper surface of the head is fairly smooth and even except for an oval depression on the median line near the posterior border.

The first thoracic segment is the widest part of the body and bears the enormous chelae which terminate in a long recurved scythe-like dactylus. The lower border of these chelae presents several teeth or projections, notably a long, triangular downwardly and distally directed one near the end of the propodus. Their superior border is evenly curved.

In strong contrast to their flattened dorsal surfaces, the thoracic segments (especially toward the posterior end of the body) have their median ventral region produced downward into a keel-like projection. On the seventh segment this is long and more or less terete, and has an obliquely forward and downward direction. Except the first, the thoracic segments are of nearly uniform width, though varying greatly in length, the fifth, sixth and seventh being the longest; the abdominal segments are equally wide but all very short except the telson, which is broadly rounded behind. The thoracic legs are long, weak and slender; the first pair behind the chelae have the terminal claw much longer than the others, and the last three legs are somewhat stouter than those in front. The pleopoda are developed on all the five first segments of the abdomen. They are short, and bear an abundance of long swimming hairs. The uropoda each consist of a short basal segment which reaches a little beyond the telson and two terete branches, the inner of which is longer and stouter, though so far as I could demonstrate, they both consist of two segments.

The collection comprises five specimens, (original collector's number 22497), from Kartabo, British Guiana. These were all taken from the stomach of a six-inch cat-fish, *Pimelodus clarias* (Bloch). Its nearest ally seems to be *N. dimorphus* (Beddard), 1886, as noted in the introductory part of this article. The species is named for William Beebe, Director of the Tropical Research Station.

## Suborder FLABELLIFERA

## Family EXCORALLANIDAE

*Excorallana berbicensis* Boone, 1918.

*Excorallana berbicensis* Boone, 1918, *Proc. U. S. Nat. Mus.*, LIV, p. 594, pl. XCII, fig. 1.

(Plate VIII, figs. 3-8 incl.)

The collection contains two specimens, a female 7.8 mm. long and a male 6 mm. long, which I refer to this species. The original description was based on two specimens, apparently both females. The discovery of the male shows that it is a species very closely related to *E. tricornis* (Hansen), 1890, known from the West Indian region, and represented, according to Richardson, 1905, p. 141, by a subspecies (*occidentalis*) in the Gulf of California. From that species it is however at once distinguished by the absence of incisions in the sides of the tapering part of the telson, and in the female apparently also by the entirely smooth upper surface of the head. In the male the head bears an anterior median process or prominent tubercle, and a pair of somewhat smaller ones between the eyes as in *E. tricornis*, and the surface of the head within the triangle thus formed is depressed or concave.

Body rather elongate, more so in the female, where the greatest width is contained over three times in the length, than in the male, where it is contained about two and three-quarters times. In the male specimen the first thoracic segment is considerably longer, and the fifth, sixth, and seventh considerably shorter than the rest; in the female not only are the individual thoracic segments, except the first, proportionately longer on the median line and narrower, but only the seventh is conspicuously shorter. The first three have the posterior lateral angles rounded off; the last four have them sharp and extended backward to an increasing degree as the rear end is approached. Articulation firm; body surface for the most part hard and smooth, except for a minute irregular pitting visible only on considerable magnification. The last two or three thoracic and the third and fourth abdominal segments bear a row of small tubercles near the posterior edge, also a few short backwardly directed hairs. The fifth abdominal segment bears four tubercles along the posterior border; the telson has two pairs of small ones on the anterior part (two near the middle and two near the bases of the uropoda). These tubercles, which are all small, are more conspicuous in the male specimen, though present in both sexes. Legs of the first three pairs stout and provided with prehensile claws. The merus of the first pair bears on its lower outer aspect a row of five blunt tubercles. On the succeeding pair there are four of these tubercles (the middle one of the row being wanting); on the third pair but three. This is the condition in both the male and female specimens. The fourth to seventh legs are elongate, slender and not prehensile.

The head is narrow and rounded in front except for a small median process. The eyes are large with about eight horizontal rows of ocelli, with eight ocelli in the longest rows. The first antennae meet at the median line and form the extreme front outline of the head; they have ten articles in the flagellum, the first being very short and the second (in the female specimen, also the third)

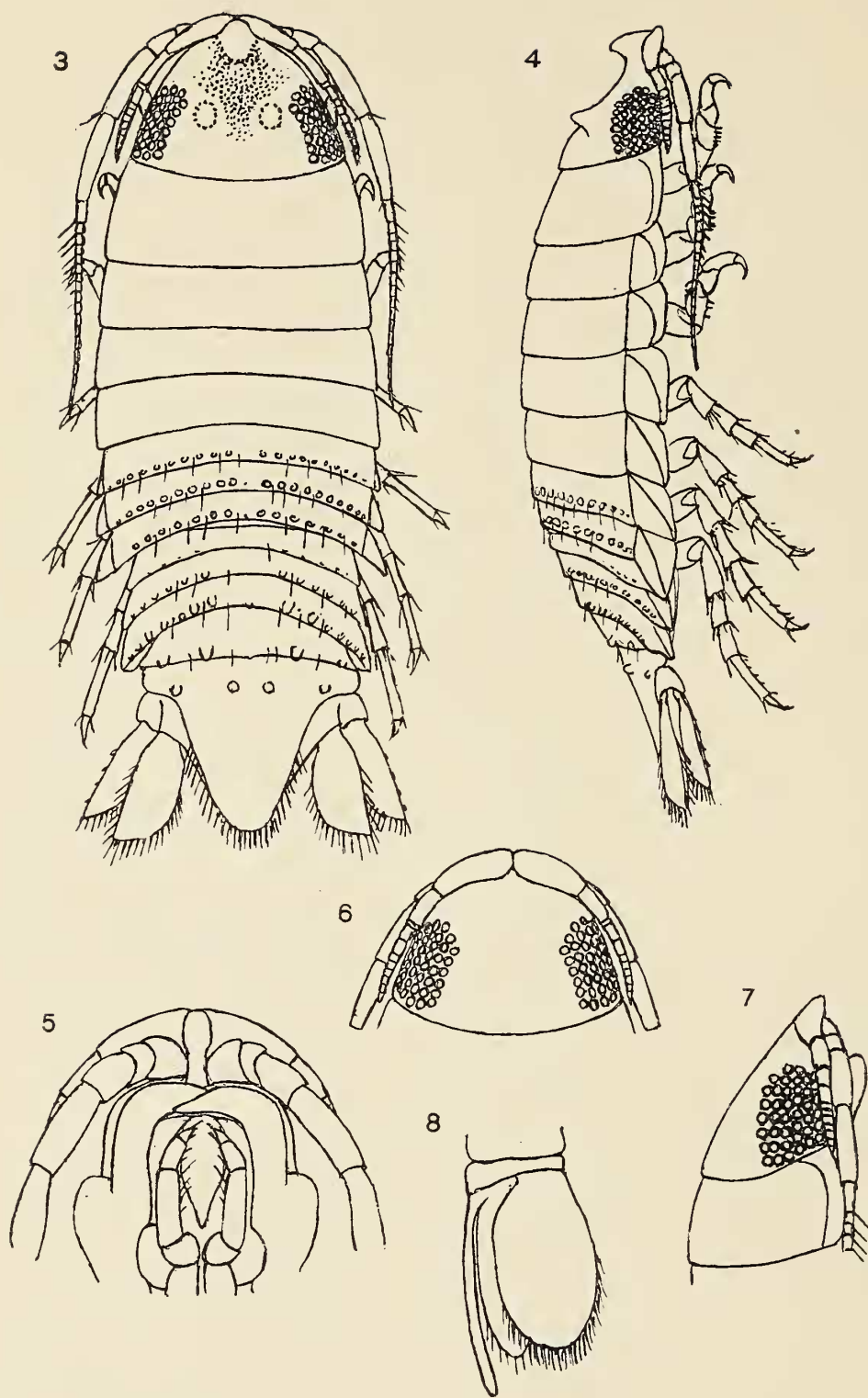


Plate VIII.—*Excorallana berbicensis* Boone, 1918; 3, and 4, male  $\times 13.5$ ; 5, ventral aspect of head of female  $\times 19$ ; 6 and 7, dorsal and lateral aspects of head of female  $\times 14$ ; 8, second abdominal appendage of male  $\times 22$ .

article being somewhat elongated. They reach, when drawn back, a little way beyond the rear border of the head. The second antennae have the three basal joints short and the fourth and fifth long, the flagellum has eighteen to twenty articles of which the first is more elongated than the succeeding ones; they reach, when well drawn back, along the fourth thoracic segment to about its middle. They are a little slenderer in the female than in the male.

The abdomen is wide; its first segment is practically covered by the seventh thoracic; the fifth has its lateral ends covered by the backwardly produced ends of the fourth. The second pleopoda of the male bear a slender blunt-ended styloid process longer than the foliaceous parts of the appendage. The terminal half of the telson and the branches of the uropoda, except the outer edge of the outer branch, are fringed with hairs. The inner branches are wide; the outer narrow, and both have the ends obliquely truncated.

The two specimens described above are both inferior in size to Miss Boone's type from the Rio Berbice, British Guiana, which measured 13 mm. by 4 mm. They were both collected at Kartabo, British Guiana, by William Beebe (collector's number of male 221104, of female 22364). The male was taken from the gills and the female from the pectoral fin of different specimens of *Lycengraulis grossideus* (Cuvier).

#### Family CYMOTHOIDAE

##### *Livoneca symmetrica*, sp. nov.

(Plate IX-X, figs. 9-14 incl.)

The six adult specimens in the collection range from 20.6 to 17 mm. long. All but two are females with large marsupial plates forming a large well distended marsupium. The two others, though lacking the marsupial plates, are quite similar to the rest in other respects and are apparently also females. The body surface is very slightly rough, pale yellowish in color, and bears minute scattered spots of blackish pigment.

The head in a dorsal view is gently rounded in front and behind with straight sides converging toward the front. It is scarcely at all set back into the thorax, though the first segment of the latter is produced forward a little way into a small lobe of rounded-triangular shape at each of the forward corners. The eyes are rounded-oblong in outline, of fair size, and well pigmented. The front of the head is somewhat bent down over the bases of the antennae. The antennae of the two sides arise well apart. The first pair is the stoutest, and is eight-jointed. The second pair is more slender and a little longer and is nine-jointed. The form of the thoracic segments and their epimera are sufficiently shown in the figures here given. The legs are fairly long, but the thighs are not expanded or provided with a keel. The dactyli are strongly hooked and increase in length from the first to the sixth pair; those of the seventh pair are smaller even than those of the first. The abdomen is wide and slightly diminishes in width toward the rear. It is deeply set into the thorax, and the lateral ends of all its segments except the first (which, however, is of the full width), are bent backward and pointed. The telson is wide and strongly arched, and has the posterior outline slightly produced, forming an obtuse median angle. The

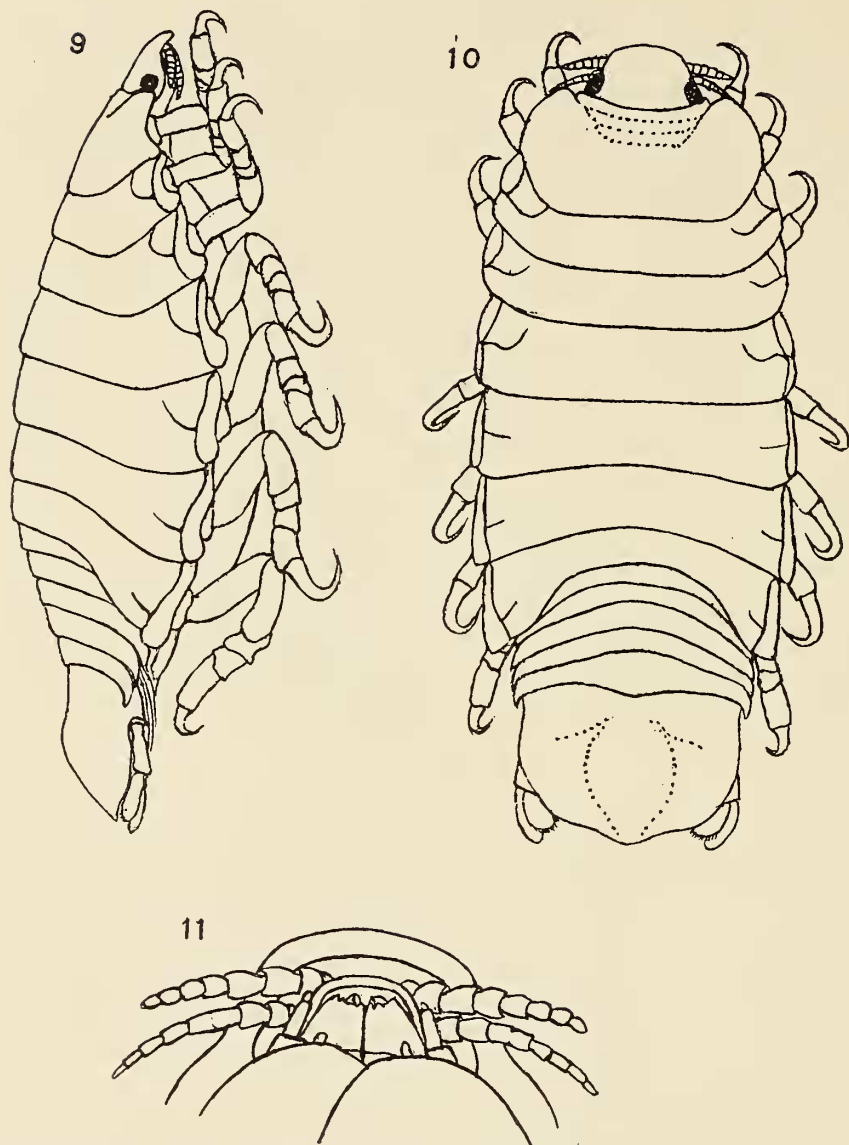


Plate IX.—*Livoneca symmetrica*, sp. nov.: 9 and 10, female  $\times 4$ ; 11, ventral aspect of head same  $\times 12$ .

uropoda reach to or slightly beyond its end; the outer branch is slightly falcate, the inner is shorter and oval. Both are rounded at the end.

A larval individual (fig. 12) from the marsupium of one of the adults is about 3.6 mm. long and differs much from the adult, not only in the proportionately larger and longer abdomen and telson, but in the very much greater length of the head, which is produced in triangular form anterior to the eyes to a remarkable extent. The upper parts bear more blackish pigmentation than the adults have; this is distributed chiefly in rather narrow median and lateral stripes (one on each side) and in thin, broken transverse lines on the thoracic and abdominal segments. The eyes are larger and more deeply pigmented than in the adult, and the antennae, though having the same number of segments, are proportionately longer. The seventh pair of legs are not yet developed and the corresponding thoracic segment is very short and small. The other legs are long and all have strong hooked dactyli, those of the anterior legs being the largest. The propodus of all the legs is somewhat widened and flattened, but is without spines; the dactyli are not denticulated.

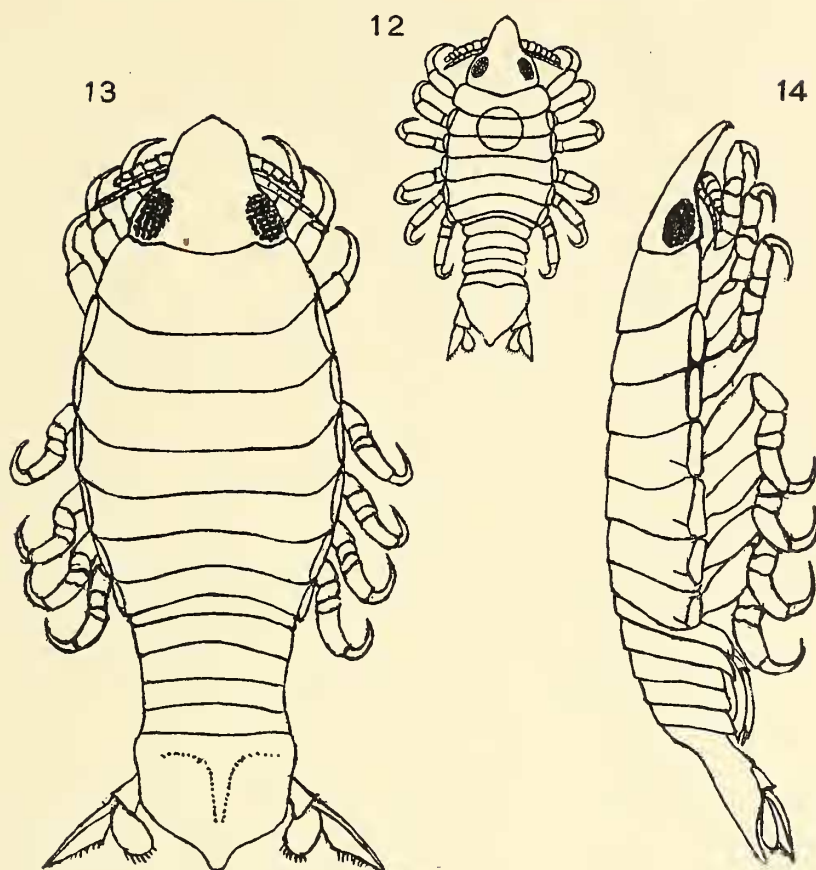


Plate X.—*Livoneca symmetrica*, sp. nov. Young stages; 12, larval individual 3.6 mm. long from marsupium of adult; 13 and 14, young individual 8.5 mm. long.

Schioedte and Meinert (1884) include in the genus *Livoneca* species (*L. indica* and *L. sinuata*) having the propodus of the legs of the larva without spines as in this form; in most species of *Livoneca*, when the larva is known, the propodus bears a row of spines. I am inclined to suspect that this is a character upon which not only the species of *Livoneca* but those placed by the above authors in various allied genera might well be rearranged, but this must await a knowledge of the larval forms of more members of this group. The fact that information regarding this character is available in the case of so few species makes it seem premature to place this species elsewhere than in *Livoneca*, though it is far from being a typical example of that genus.

The young individuals of this stage all bear a foetal character in the form of a definitely circumscribed circular swelling or raised area, whose surface is finely granular when dry, on the median part of the back. Its center is on the second thoracic segment, but it encroaches also on the first and third segments. Another foetal character is that the ventral region of the body is still distended by a considerable quantity of yolk.

What I believe to be a slightly later stage of this same species is represented by an individual about 4.2 mm. long, taken from a young cichlid fish (*Cichla ocellaris*). The body is more flattened than in the stage just described, the yolk has disappeared and the seventh legs are present though not fully developed. In the specimen shown in figs. 13 and 14 and which is 8.5 mm.

long, representing, I believe, still another stage in the development of this species, the seventh legs are well developed.

The specimens of this species bear the following collector's numbers and data:

- 221077—Female with empty marsupium from the gills of *Myloplus rubripennis*, Sept. 4, 1922. Type.
- 22440—Female with 28 large larvae in marsupium from Perai fish, *Serrasalmo rhombeus* Linnaeus, July 22, 1922.
- 2412—Four adults (two with marsupium which in one case contained large larvae) from giant catfish or Lau-lau (*Brachyplatystoma* sp.), March 4, 1924.
- 201529—Two larvae like fig. 12, probably from the marsupium of an adult.
- 221007—Young individual, shown in figs. 13 and 14, from the scales of the catfish *Hemidorus carinatus* (Linnaeus).
- 24485—Very young individual 4.2 mm. long taken from a young Lucananni fish, *Cichla ocellaris* Bloch and Schneider, May 4, 1924.

***Livoneca guianensis*, sp. nov.**

(Plates XI–XII, figs. 15–18 incl.)

The two adult specimens that were collected are females 17.7 mm. and 26 mm. long respectively, each having a well developed marsupium which contains embryos in the smaller specimen.

The body is of elongate obovate outline, slightly assymetrical, widest at the third thoracic segment, behind which it tapers in width regularly to the end of the thorax. The head is but little set back into the thorax except that the first segment of the latter is extended forward in a small round-triangular lobe at each anterior corner. The sides of the head converge forward; the front is obtusely triangular, with a small rounded-triangular median point or process. The abdomen is of almost uniform width, not much less than that of the end of the thorax, and is but little set forward into the latter. The body surface is smooth and highly polished, of the usual yellow color without pigment except a very few blackish dots distributed chiefly along the median dorsal line and near the rear borders of the segments.

The upper surface of the head is convex and the anterior tip is considerably bent down. The eyes are small, rounded and situated on the sides of the head; they are well pigmented. The first antennae arise well apart. They are very short and stout, with eight joints, of which the second is considerably the longest, but not swollen. The joints are not compressed. The second antennae are slender and have but seven joints which are somewhat compressed. The first two are wide but very short, the others are so elongate that this pair of antennae slightly exceeds the first pair in length.

The first segment of the thorax is wide and moderately long; the second and third (the latter the widest of all, as above stated) are short; the succeeding ones are all rather long. They have rather narrow but thick epimera, which except in the case of the seventh, fail by a greater or less interval to reach all the way along the lateral end of the segment. The legs are only moderately

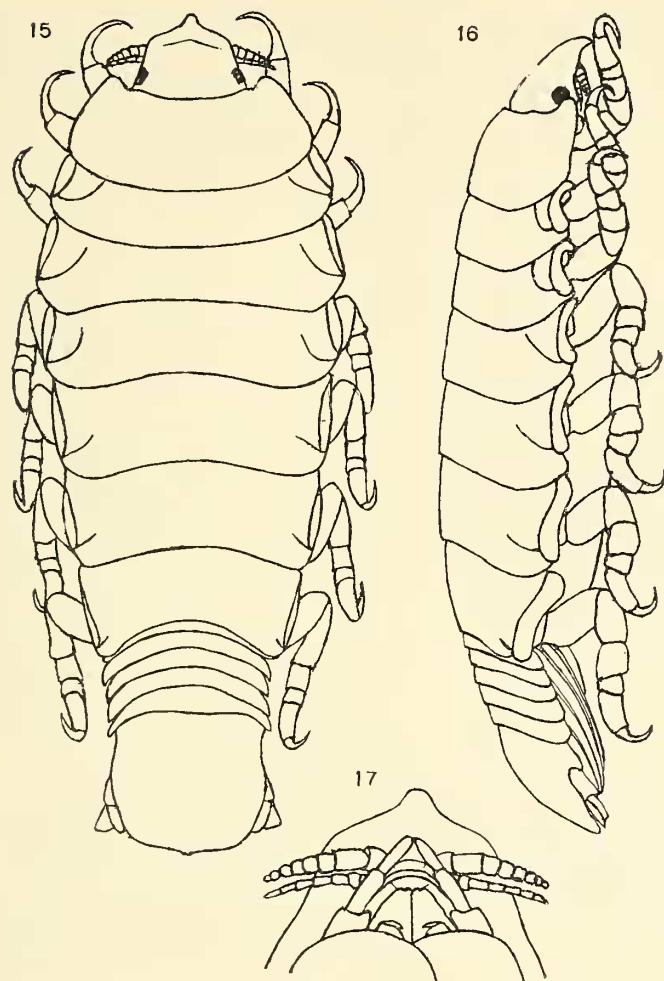


Plate XI.—*Livoneca guianensis*, sp. nov.; 15 and 16, female  $\times 4.6$ ; 17, ventral aspect of head of same,  $\times$  about 10.

stout, but considerably compressed laterally, so that they appear much stouter in a side view. The dactyli are sharp and hooked, and vary comparatively little in length; those of the first pair are, however, the longest, although the last pair of legs exceeds the others in total length.

The abdominal segments have the lateral ends obliquely truncated and the posterior corners rounded off. The telson is about as wide as the rest of the abdomen and about as long as it is wide. It narrows but little toward the rear end, which is rounded off, but bent down so as to appear almost truncated in a dorsal view of the animal.

The uropoda are shorter than the telson. The outer branch is wide and somewhat obliquely truncated at the end; the inner branch is oval.

The smaller of the two (the type and subject of the figures) was collected by William Beebe at Kartabo, British Guiana, July 7, 1920.

The larger one (original number 201518) also from Kartabo, was taken from the gills of *Leporinus fasciatus* (Bloch). It differs little from the other except in size and in having the last thoracic segment somewhat shorter, the abdomen being more set back into it.

A third individual, only 12 mm. long and not over 3.9 mm. wide at the third

thoracic segment (thus proportionally narrower than the larger ones) is evidently immature. It was taken from the gills of a fish, *Pimelodus clarias* (Bloch), which had been eaten by a snakebird, June 3, 1924. (Collector's number 24818).

The collection contains also a small larval isopod (collector's number 2412) having the seventh thoracic legs still undeveloped, which was taken from the Giant Catfish (*Brachyplatystoma* sp.) March 4, 1924. I give a figure (fig. 18)

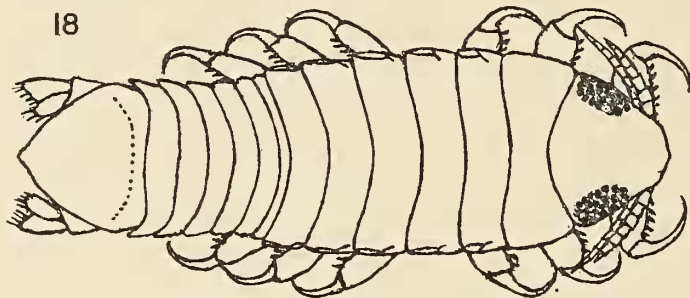


Plate XII.—18, Larval isopod, 2.4 mm. long; possibly young of *Livoneca guianensis*, sp. nov.

of this specimen here as possibly belonging to this species, but without committing myself to that opinion. Embryos taken from the marsupium of the type of the species just described (*Livoneca guianensis*), were in too early a stage to give evidence either for or against this view.

The specimen is only 2.4 mm. long and of decidedly flattened form. The anterior end of the head bends down slightly in front of the antennae. The eyes are large and have about 30 ocelli. The first antennae arise well apart; they are stout and do not much more than reach the rear border of the head. They apparently have 8 segments; the second pair are somewhat longer and slenderer and have 9 or 10 segments.

The six pairs of legs are rather long and all terminate in large curved dactyli which do not have their concave margins denticulated. The anterior edge of the propodus (the limb being laterally extended) bears a row of five or six short spines. This is true of all the legs. The propodus is moreover much widened and flattened, especially in the case of the first three pairs.

The abdomen is somewhat narrower than the thorax, but not abruptly so. The telson has an outline approaching an equilateral triangle with the lateral borders convex; its anterior margin is raised or thickened. The branches of the uropoda do not exceed the telson, their outer branches are truncated obliquely; the inner branches are smaller and of ovate outline. Both branches are fringed with a few short stout hairs.

*Telotha henselii* (von Martens), 1869.

*Cymothoa henselii* v. Martens, 1869, *Arch. Naturg.*, XXXV, part 1, p. 33, pl. II, fig. 6.

*Telotha henselii* Schioedte and Meinert, 1884, *Naturh. Tidsskr.* (3) XIV, p. 287, pl. X, figs. 11, 12; Richardson, 1904, *Proc. U. S. Nat. Mus.*, XXVII, p. 23; Niewstrasz, 1915, *Zool. Meded. Rijks. Mus. Leyden*, Ann. 1915, p. 95.

(Plate XIII, figs. 19-23 incl.)

The Kartabo collection contains nine specimens which appear to be refer-

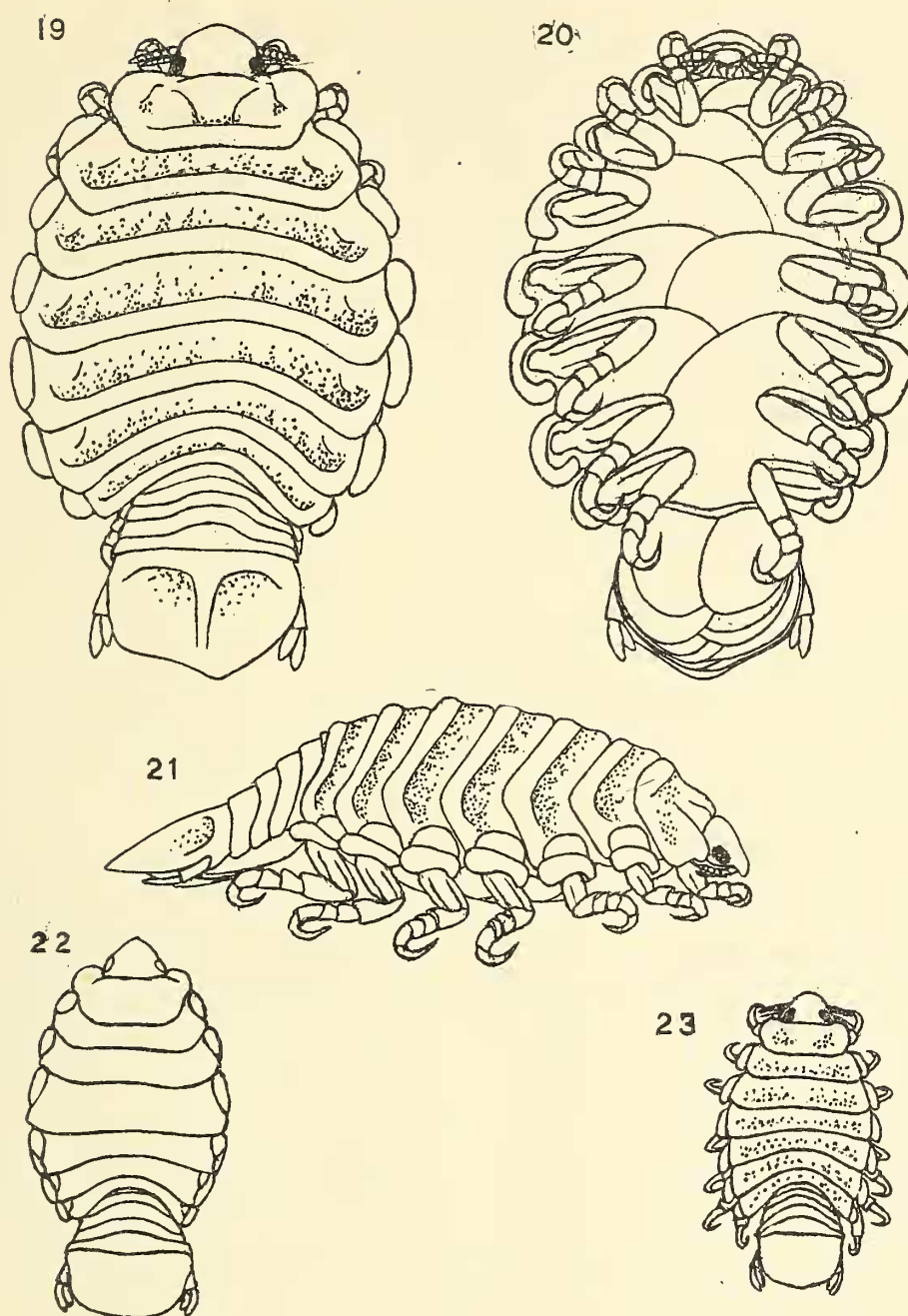


Plate XIII.—*Telotha henselii* (von Martens) 1869; 19 to 21, female (16 mm. long) 3.8; 22, very old individual (26 mm. long)  $\times 1.4$ ; 23, young individual (6.6 mm. long)  $\times 4$ .

able to this species; they are of various ages ranging from a very large and old individual 26 mm. long down to immature ones little over 6 mm. long; these, however, have already reached a stage differing comparatively little from the adult (fig. 23). The largest individual has no marsupium but is apparently a female. If so, there is no adult male in the collection, neither have other authors given a description of it. The older specimens have the body surface practically devoid of any pigment (except in the eyes). Younger specimens have scattered, minute, blackish dots, chiefly near the lateral ends of the segments and along the anterior border of the telson, also a few along the median region of the back. The largest individual mentioned above, and shown in outline

in fig. 22, presents several small abnormalities, notably the exceptional length of the first and fourth thoracic segments (the second and third being unusually short), the tapering rather than oval outline of the anterior part of the body when seen in a dorsal view and the unusual length and more pointed outline of the anterior part of the head. The next largest individual, a female 16 mm. long by 10 mm. wide, having a well developed marsupium, has been chosen for the principal illustrations (figs. 19 to 21), as being a more typical specimen.

The body is quite broadly oval, rather highly arched in old specimens, but flatter in young ones. The head is wider than long and of triangular outline, rounded in front, its anterior margin is considerably bent downward. The eyes are oblong and fairly well pigmented; the first antennae, which arise a little distance apart, are stout, but little compressed in cross section, and have only eight segments (according to Schioedte and Meinert they have nine). The second antennae usually exceed the first pair a little in length, they are much slenderer and have nine segments. The head is not deeply set back into the thorax.

The thoracic segments have the posterior border thickened and very prominent, in front of this the surface of the segment is more or less irregularly roughened and sculptured. The epimera are large and thick, especially in the middle region of the body, and are surmounted by large convex bosses on the lateral ends of the main portion of the segments.

The legs are strong and of moderate length; their length increases toward the rear of the body. The dactyli are large and strongly hooked. The propodus of all the legs is curved, increasing the hook-like prehensile character of the limb; in the case of the three anterior legs that joint is somewhat flattened, though not much widened. The thighs are not compressed; their external aspect (the inferior aspect when the legs are drawn together under the body) is flattened or even slightly concaved. There is never more than a very slightly prominent ridge or keel.

The abdomen is rather narrow in front, moderately immersed in the thorax, and widens behind. The telson is very broad and has the posterior margin normally very gently curved, but in the individual shown in figs. 19 to 21, it is unevenly worn off, as are also some of the pleopoda, evidently by pressure and friction from some part of the host. The telson has the anterior margin thickened and the dorsal surface more or less arched or convex; in the older specimens there is a poorly defined median ridge or keel each side of which the surface is minutely pitted and roughened. The uropoda and their branches are small and short; in adults they do not reach much beyond the end of the telson.

Of the nine specimens from Kartabo, six, including all the larger ones, were together in a container bearing the collector's number 2412 and were taken from a giant catfish (*Brachyplatystoma* sp.), native name Lau-lau, March 4th, 1924.

Three small specimens have the collector's number 24757 and were taken from another catfish, *Pimelodus clarias* (Bloch), May 28, 1924.

The specimens of von Martens, five in number, were from the gills of a cichlid fish (*Geophagus* sp.) taken at Porto Alegre, Rio Grande del Sul, Brazil, and were also examined by Schioedte and Meinert. They are in the collection of the Berlin Museum. The latter authors mention also four other specimens from "somewhere in Brazil."

The differences in the outline of the individuals figured by von Martens and Schioedte and Meinert, as well as several small discrepancies between the figures of the latter and their descriptions, indicate that the specimens of these authors, just as in the case of those in the present collection, show considerable variations in many characters, and were I to regard the present specimens as constituting another species, it would be hard to find characters on which the distinction could be based. One of the most definite would seem to be their 8-jointed instead of 9-jointed first antennae, but I do not feel disposed to rely on this as a specific character, especially as some of the Kartabo specimens have their first antennae ending so bluntly that one might easily be led to assume that they had lost a segment at the tip.

The notes on the Kartabo specimens do not state on what part of the fish they were found, but from the nearly complete absence of pigment they seem most likely to have lived in the gill cavity as was the case with von Marten's examples.

### Suborder EPICARIDEA

#### Family BOPYRIDAE

*Probopyrus bithynis* Richardson, 1904.

*Probopyrus bithynis* Richardson, 1904, *Proc. U. S. Nat. Mus.*, XXVII, p. 68, figs. 47-51; 1905, *Bull. No. 54, U. S. Nat. Mus.*, p. 557, figs. 606-611; Pearse, 1911, *Rep. Michigan Acad. Sci.*, XIII, pp. 108, 109; 1915, *Proc. U. S. Nat. Mus.*, XLIX, p. 550.

(Plates XIV-XV, figs. 24-26 incl.)

A considerable series of specimens from Kartabo shows that this species is a common parasite of the shrimp *Macrobrachium lamarrei* (Milne-Edwards), 1837. It has been previously recorded by Richardson (1904, 1905) from New

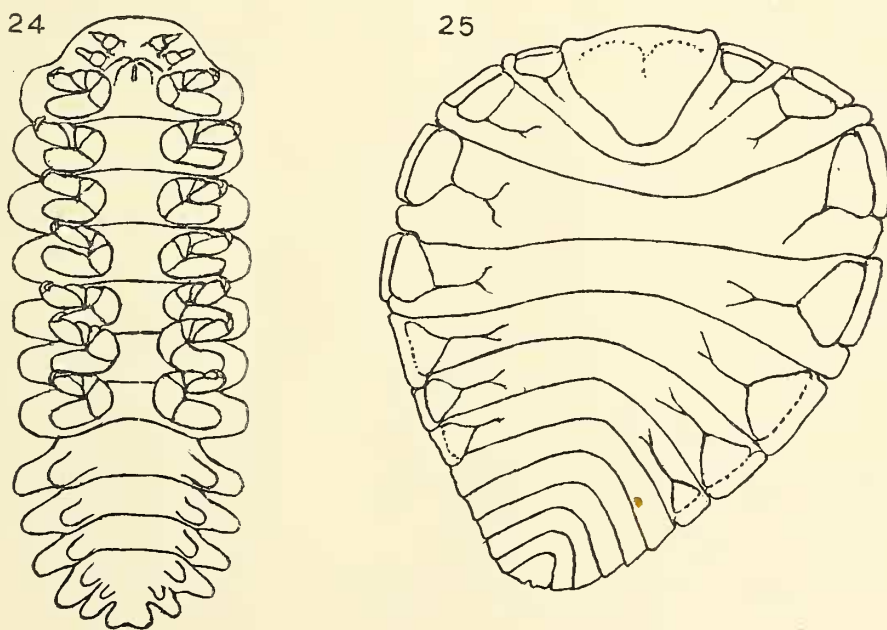


Plate XIV.—*Probopyrus bithynis* Richardson, 1904; 24, male, ventral aspect,  $\times 28$ ; 25, female, dorsal aspect.  $\times 5$ .

Orleans, Louisiana, on *M. ohionis* (Smith), and Bluefields, Nicaragua, on *M. acanthurum* (Wiegmann); by Pearse (1911, 1915) from the State of Vera Cruz, Mexico and from Santa Marta, Colombia, on *M. olfersii*, and has been so well described and figured by Richardson that its characters need not be considered in much detail here. The present specimens infest shrimps of from nearly 50 to somewhat over 80 mm. in length (inclusive of the rostrum). No infested examples were among the other specimens of this shrimp of lesser or greater length that were collected, indicating that there is a particular and somewhat limited age or size favorable for becoming parasitized. Except in one case the parasites are all adult; in almost all cases they have the marsupium well distended with eggs, and usually one of the minute males may be found clinging to the ventral side of the abdomen of the female, between and partly covered by the pleopoda. The single exception is a small very poorly preserved and evidently immature parasite in the smallest of the infested shrimps, an individual a little under 50 mm. long.

The female parasite lies in the branchial chamber of the shrimp, with the head directed posteriorly and usually somewhat dorsally (relative to the host's

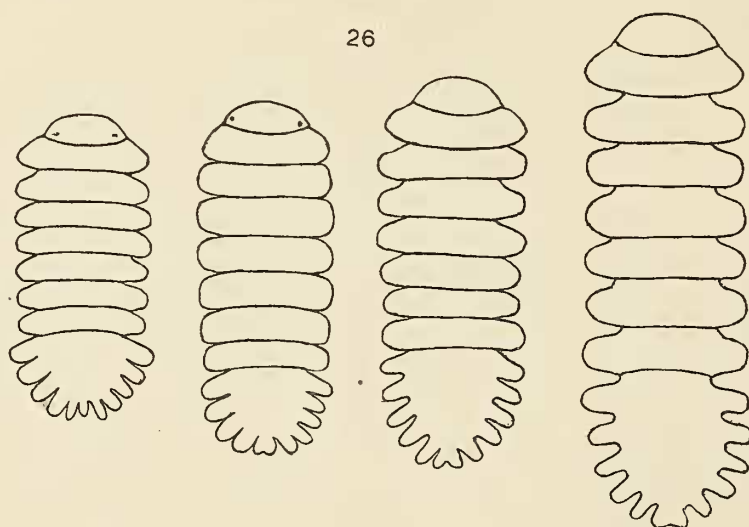


Plate XV.—26, *Probopyrus bithynis* Richardson, 1904. Outlines of segments of four male individuals to show variation in size and form.  $\times 16$ .

body) and with the ventral aspect outward and the dorsal aspect, which is perfectly flat, against the gills of the host. The body of the female is asymmetrical to a varying but usually considerable degree; the convexity of the long axis is toward the ventral side of the host, and consequently toward the left if the parasite was borne in the left branchial chamber of the host and toward the right in the opposite case. No shrimps were found infested on both sides. The female is without eyes, and measures in greatest length 10 to 11 mm. in the case of the largest individuals, which are naturally to be found in the larger and presumably older shrimps. The marsupial plates, which are far too short to completely cover the immense mass of eggs that the animal bears, are more or less pigmented with conspicuous areas of blackish pigment, some of which also occurs on the lateral parts of the segments of the shorter side of the body

on both ventral and dorsal sides of the thorax on the dorsal side, especially along the lines of articulation between these segments. The amount and intensity of the pigment is variable; it is usually quite conspicuous, even through the carapace of the host, which of course exhibits a large localized swelling over the location of the parasite. The head may or may not have the anterior lateral corners produced into more or less distinct lobes. Each of the pleopoda consists of a short basal portion bearing two broad leaf-like smooth-edged branches. There are five pairs, decreasing in size from the first to the fifth segment of the abdomen. Uropoda are wanting.

The males vary in length from 1.7 mm. to about 3 mm., this difference being due in part to actual individual variation, but still more largely to the state of contraction of the body muscles, the body being very soft. This is clearly shown in the outlines of four individuals shown in Fig. 26, which also brings out the fact that the degree of constriction between segments is largely a matter of the degree of contraction and cannot be relied on as a specific character.

The body of the male is of oblong outline, moderately arched, with the thoracic segments all distinct and the abdominal segments all fused into a somewhat semicircular flattened mass with eleven rounded lobes around the margin. Ten of these represent the lateral ends of the abdominal segments; the median one, which may be longer or shorter than the adjacent lobes and is usually more or less emarginate or partially cleft into two, represents the telson. The head is rather short and wide and bears two minute pigment spots (sometimes not discernible) representing eyes. The mouth parts form a projecting mass on the lower side of the head, the two pairs of antennae are short and composed of a short, swollen basal part and a slightly longer abruptly narrower portion, on the extreme tip of which there are, on the first pair only, one or two very minute articles, but owing to the soft character of the structures and the indistinctness of the articulations the number of joints was not satisfactorily determined. The thoracic legs are all well developed and bear small but sharp and strongly hooked dactyli; the pleopoda are represented by five pairs of small rounded lobes or projections. No uropoda are present.

Twenty-nine parasitized shrimps of the above species were collected, each bearing a female to which a male is usually attached. (Original numbers 20903, 201532 and 201556, the last is dated 3-9-1919).

*P. floridensis* Richardson, 1904, p. 70, figs. 52-55; 1905, p. 555, figs. 602-605, from the St. John's River, and Miami, Florida, parasitic on *Palaemonetes exilipes*, is an allied species though apparently distinguishable by the somewhat rounded ends of the abdominal segments in the female, those of *P. bithynis* being squarely cut off. Another evidently closely related form is *P. pandalicola* (Packard), 1879 (see Richardson, 1905, p. 554, figs. 599-601) recorded from various points on the American coast from New Hampshire to Florida and Mississippi, parasitic on *Palaemonetes vulgaris* (Say) or allied species. This appears to be distinguished from *P. bithynis* chiefly by having the posterior prolongations of the first pair of marsupial plates distinctly hooked, and the lobes representing the fifth abdominal segment fused with the median one representing the telson.

*P. panamensis* Richardson, 1912 (Proc. U. S. Nat. Mus., XLII, p. 523, figs. 5-8) from the Canal Zone, Panama, parasitic in *Macrobrachium acanthurum*,

is still another closely allied form, distinguished by having the telson of the female notched (which, however, is often the case in the present species), and by having only the two last abdominal segments of the male fused into a distinctly separated piece.

### Suborder ONISCOIDEA

#### Family ONISCIDAE

#### Subfamily EUBELINAE

*Ethelum americanum* (Dollfus), 1896.

*Mesarmadillo americanus* Dollfus, 1896, *Proc. Zool. Soc. London*, ann. 1896, pp. 397-398, Richardson, 1901, *Proc. U. S. Nat. Mus.*, XXIII, p. 573.

*Ethelum americanum* Budde-Lund, 1899, *Rev. Crust. Isopod. Terrest.*, p. 24; 1899, *Entomol. Meddel.*, (2) 1, Pt. 2, p. 90; Richardson, 1905, *Bull.* 54, *U. S. Nat. Mus.* p. 589, figs. 649, 650 (copied from Budde-Lund and Dollfus respectively); Pearse, 1917, *Occ. Papers Mus. Zool. Univ. Michigan*, No. 46, p. 1.

(Plate XVI, figs. 27-36 incl.)

I have little hesitation in referring the three small specimens listed below to the present species in spite of two or three discrepancies.

The largest female would measure, if straightened out, a trifle over 6 mm. long, the only male specimen scarcely 5 mm. long. The color is grayish brown above, with small light yellowish markings, the uropoda reddish yellow, and the legs and under parts yellowish.

The description given by Dollfus and quoted in Richardson (1905) is excellent for a brief diagnosis, but its shortness makes the mention of some other details desirable. The body is convex, and not very wide, with nearly vertical epimera except on the abdomen, where they bend or flare outward a little. Surface smooth except for a slight individual convexity of each segment, and a slight, scabrous pubescence; pubescence is more pronounced on the antennae and limbs. As shown in Dollfus' figure the epistome is continuous with the forehead in the middle, but ends in a small rounded slightly projecting lobe under each eye, separated from the forehead by an impressed line or groove. A branch of this groove (not shown in Dollfus' figure) runs up on the forehead a little way, along the inner side of the eye. Ocelli about 13 in the smaller specimens, the largest female has a few more.

The first thoracic segment has a slightly projecting lateral border which is wide (especially toward the front) in a lateral view and is separated from the body of the segment by a very deep furrow that curves sharply upward as the head is approached. It does not reach all the way to the posterior end of the segment. The posterior corner has a short V-shaped cleft to receive the second segment when the body rolls up. This cleft has the outer side (forming the posterior lateral angle of the segment) obliquely truncated; the inner side, which is very slightly longer, is sharply rounded off. The lateral ends of all the thoracic segments are somewhat rounded, the second, third and fourth more than those behind them. All the thoracic segments have the rear corners produced backward a little, but to a less extent as the posterior end is approached.

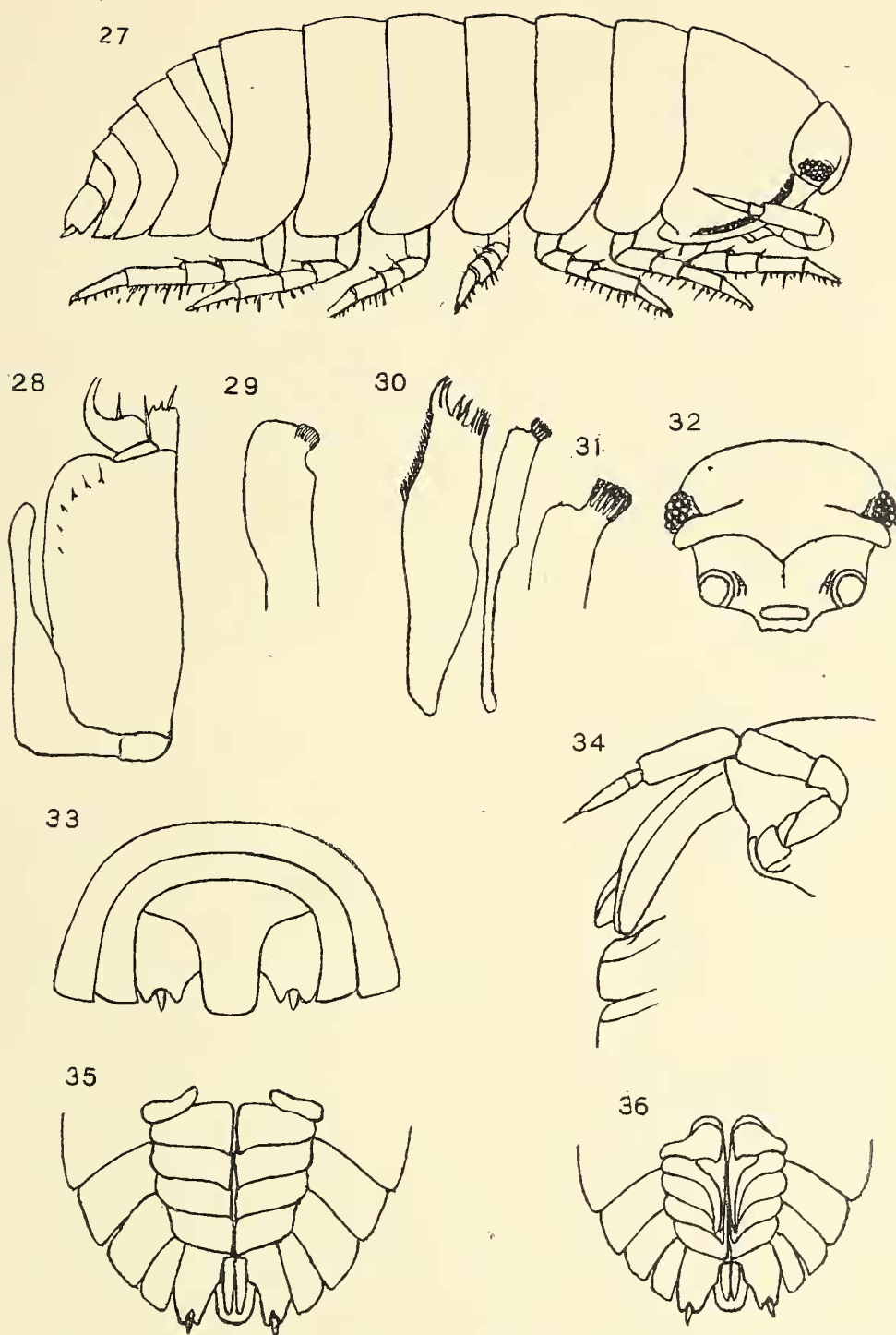


Plate XVI.—*Ethelum americanum* (Dollfus) 1896; 27, female  $\times 13$ ; 28, maxilliped  $\times 52$ ; 29, second maxilla  $\times 52$ ; 30, outer and inner divisions of first maxilla  $\times 52$ ; 31, tip of inner division of first maxilla  $\times 52$ ; 32, front of head  $\times 16$ ; 33, rear end of body  $\times 18$ ; 34, ventral aspect of anterior segments and antenna  $\times 18$ ; 35, ventral aspect of rear end of body of female  $\times 13$ ; 36, same of male  $\times 11.5$ .

The legs are slender but fairly long, with only moderately developed spines. The basal segments of the uropoda are thick and convex, standing out more than the telson. The external branches are small and of tapering form, and are inserted in a deep notch in the extreme end of the basal segments.

The chief discrepancies between the above described specimens and previous descriptions are that I find no coxopodite process on the second thoracic segment, which merely has the anterior edge of the epimeral part thickened as though by an infolding of the edge (the third segment also shows this to a less degree); that the inner branch of the first maxilla bears five instead of four plumose tufts (verified on both right and left sides); and that the inner branches of the uropoda are longer than described, reaching nearly or quite to the end of the telson. I do not feel justified in assuming that the present specimens are a new species because of differences so small and so likely to be explainable by the difficulties of exact observation in the case of such a small form.

These specimens were collected by William Beebe at Kartabo under dead wood at the edge of the jungle, September 22, 1922. (Collector's number 221115). It has also been recorded from Dunoon, British Guiana, on trees among bromeliads, vines, etc., by Pearse, 1917. The species was described by Dollfus from St. Vincent, W. I.

#### Subfamily ONISCINAE

*Leptotrichus pittieri* Pearse, 1921.

*Leptotrichus pittieri* Pearse, 1921, *Proc. U. S. Nat. Mus.*, LIX, p. 460, fig. 1

(Plate XVII, figs. 37-42 incl.)

I feel little hesitation in referring the specimens here illustrated to this species, which was briefly described by Pearse, in spite of two small discrepancies that his figures show, the antero-lateral lobes of the head being somewhat more prominent and angular and the telson a little narrower in his figures than I find them to be in the Kartabo examples.

The body is rather broad and, as seen from above, of ovate outline, the head wide and short and set back nearly half its length into the thorax, and the abdomen rather small and tapering. It is of rather delicate structure, the segments and limbs being loosely articulated and the length to width ratio of the body varies very greatly with the degree of contraction of the muscles connecting the segments. The specimens in the collection range from about 3 mm. to 4.2 mm. long, the variation being due more to different conditions of contraction than to size. The specimen illustrated in figs. 37 and 38 has them considerably contracted and the segments drawn well together. It is possible that the females are somewhat wider-bodied than the males, but this is difficult to determine certainly in the varied states of contraction of the preserved specimens. The color is light yellowish or yellowish white, the body being unpigmented.

The most characteristic feature of the species is the one first mentioned in Pearse's short description and illustrated in one of his figures. This is the modification of the hairs or setae covering the body into minute, short, thick, often

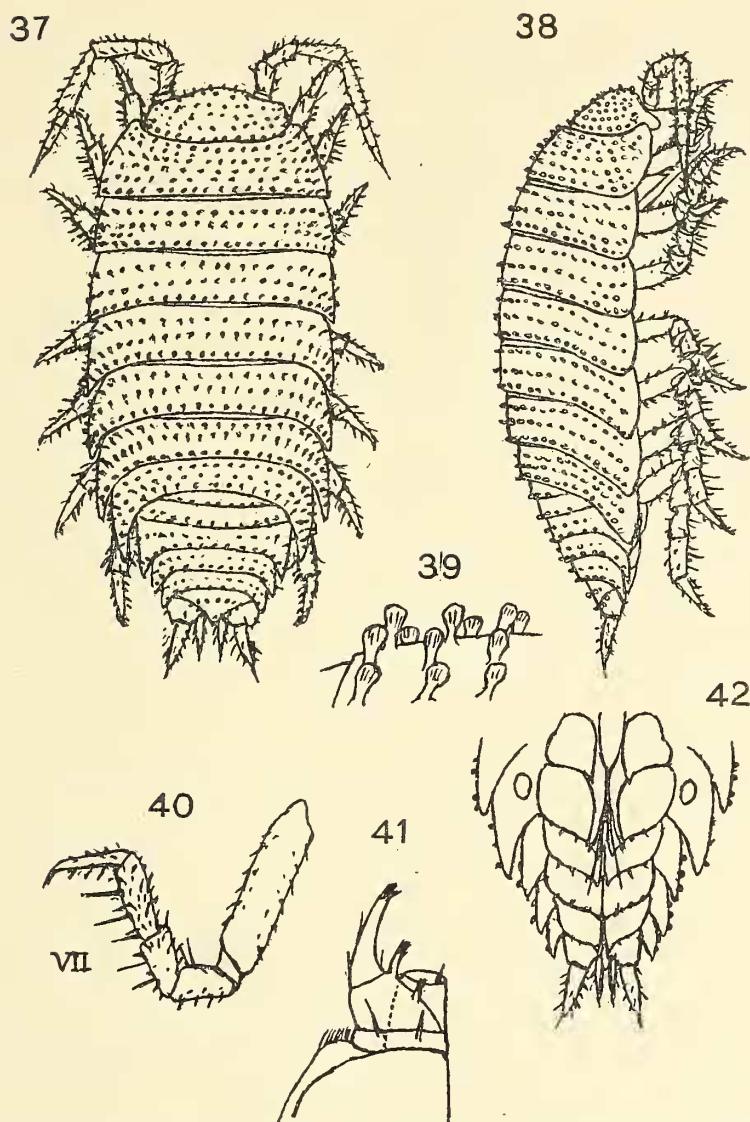


Plate XVII.—*Leptotrichus pittieri* Pearse, 1921; 37 and 38, female  $\times 16$ ; 39, modified setae on dorsal surface  $\times 60$ ; 40, seventh leg  $\times 32$ ; 41, tip, of maxilliped  $\times 94$ ; 42, lower side of abdomen of male,  $\times 21$ .

distinctly club-shaped or capitate processes of a soft, flexible consistency (fig. 39). On the antennae, legs, pleopoda, etc., however, the setae retain their original hair-like character and intermediate conditions between ordinary hairs and the club-shaped structures may be observed on various parts of the body.

On the back these modified setae are arranged in fairly regular transverse rows, some thirty or more in a row in the wide parts of the body, and three rows on most of the thoracic segments, though there are four on the lateral parts of the second segment and more numerous rows on the first segment and head. The abdomen has one row on the first and second, two on the third, fourth and fifth segments. When these structures are rubbed off, which easily happens, the body is left quite smooth. The antennae are rather short and have the flagellum with two distinct articles, the first one rather short. The second article exhibits, however, a more or less noticeable joint a little beyond its middle, but this is apparently so firmly consolidated as to be immovable. Apparently we have in this species a form in which the flagellum, originally

composed of three articles, is becoming reduced to a two-segmented condition by the fusion of the two terminal articles. The eyes are very poorly developed and inconspicuous.

The first thoracic segment is the longest, the seventh the shortest. All except the first have the posterior angle extended back to a successively increasing extent. This angle is well rounded off in the first four thoracic segments, and not actually sharp in any of them. The third to fifth abdominal segments have the corresponding angles sharp and also well extended back. The legs are of moderate length, stout and well provided with spines and hairs. Sexual differences in them were not noted.

The telson is triangular, with slightly concave sides; the external branches of the uropoda are stout at the base, tapering rapidly to a point, and are of more or less terete section. The inner branches are somewhat shorter, as well as being inserted on the basal joint at a point farther forward, and are compressed so as to appear narrow in a dorsal but rather wide in a lateral view.

Three specimens were obtained at Kartabo from dead wood (Collector's number 22349). Another was obtained by sifting, and still another is without data. Their unpigmented body and rudimentary eyes show adaptation to a burrowing life.

Pearse described the species from a specimen found under a log at Maracay, Lake Valencia, Venezuela. He does not indicate that he had more than one specimen.

*Circoniscus gaigei* Pearse, 1917.

*Circoniscus gaigei* Pearse, 1917, *Occ. Papers Zool. Mus. Univ. Michigan*, No. 46, p. 4, fig. 2.

(Plate XVIII, figs. 43-51 incl.)

The largest specimen of this species in the Kartabo collection is a male which, if it could be straightened out might measure nearly 16 mm. long; the largest female would probably measure about 13 mm. The ground color of the upper parts of the alcoholic specimens varies from rather dark grayish brown to pale brown with a grayish tinge. There are numerous very small somewhat irregular yellowish markings on the forehead and lateral parts of the back; the lower parts, limbs and antennae are unpigmented and of a uniform yellow color. Two of the females have marsupial plates but are not carrying young. The plates are rather small and do not overlap much along the median line.

Body highly arched, and fairly broad in spite of the lateral ends of the segments extending down almost vertically. An exception to this statement is that the first thoracic has the front part of the border narrowly rolled outward and that the ends of the third, fourth and fifth abdominal segments bend or flare outward a little. Articulation firm and compact. In a dorsal view the front of the body (including the front of the head) is rounded in a broader curve than the posterior end.

Body surface very smooth and even. No tuberculation. The surface is very thickly dotted with minute, scabrous punctae bearing very minute short hairs. On the antennae, legs, etc., there is a coarser and more conspicuous pubescence. Legs rather weak and slender, with rather weak but moderately numerous spines.

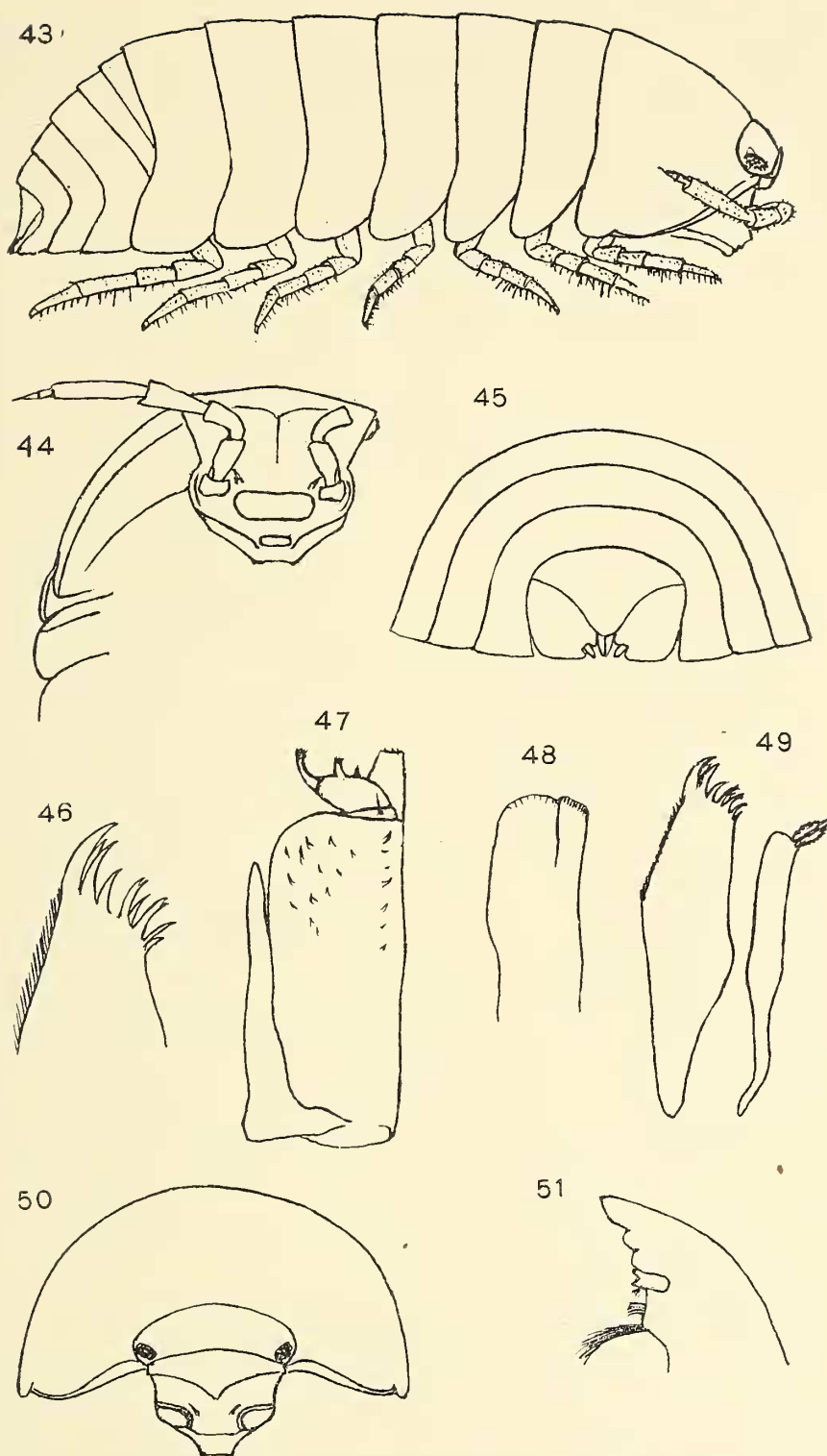


Plate XVIII.—*Circoniscus gaigei* Pearse, 1917; 43, female  $\times 6.5$ ; 44, ventral aspect of anterior segments  $\times 8$ ; 45, rear end of body  $\times 8$ ; 46, tip, of outer division of first maxilla  $\times 40$ ; 47, maxilliped  $\times 28$ ; 48, second maxilla  $\times 28$ ; 49, inner and outer divisions of first maxilla  $\times 28$ ; 50, front of head and first thoracic segment  $\times 6$ ; 51, tip of right mandible  $\times 35$ .

Head rather narrow, forehead low, upper edge of the epistome arched, forming a projecting upturned border distinct all the way across the head. First antennae minute, composed of three segments, the second the shortest; the terminal one much more slender than the others. Second antennae short and small, conspicuously and stiffly pubescent, the flagellum of two very small short articles which together are less than one-third the length of the last segment of the peduncle and of much smaller diameter than the latter. The terminal article bears a rather large, movable terminal bristle. The mouth parts form a very prominently projecting mass. Mandible with a row of four small tufts of hairs ("penicilli") on the inner aspect distal to the large brush-like tuft. Eyes rather small, ocelli fairly numerous, apparently at least twenty-five in the largest specimens but not all well defined or well pigmented.

First segment of the thorax rather large and wide, the anterior part of its lateral border narrowly rolled outward to form a rather thin projecting border. This diminishes toward the rear and disappears a little way from the rear corner where the rear part of the lateral face of the segment extends down vertically into a small semicircular lobe that forms the posterior lateral corner of the segment. In a ventral view it can be seen that this lobe forms the outer and longer side of a very small V-shaped notch for the reception of the second segment when the body is tightly rolled up. The inner side of the notch is very short and much thicker. The border of the segment is not sulcated. The inner side of the lateral part of the second segment has the anterior edge thickened, but no process is developed on this or on any succeeding segment. Lateral ends of second, third and fourth thoracic segments narrow and sharply rounded; the fifth is rounded on a larger curve, and the sixth and seventh more squarely cut off.

The abdominal segments, including the large basal segments of the uropoda, are squarely truncated. Telson triangular, with curved sides and a slightly rounded apex which does not quite reach the end of the body, the tips of the two inner branches extending a little beyond its apex. The outer branches are very small and short and inserted in notches in the extreme inner posterior corners of the basal segments, thus coming close against the terminal parts of the inner branches.

Three of the specimens from Kartabo are without collector's notes, the other two were found as follows:

Collector's number 22349 from dead wood July 5, 1922.

" " 22448 from a dead stump July 23, 1922.

Pearse (1917) described this species from specimens from Dunoon, British Guiana, where it was collected in rotten logs, under loose bark of trees, and also in dry sand. He established for it the new genus *Circoniscus*, resembling the Old World genus *Synarmadillo* Dollfus, in many characters. One of its distinctions from *Synarmadillo* is in its possessing a row of four small tufts of hairs ("penicilli" in the terminology of Budde-Lund) on the inner aspect of each mandible distal to the large brushlike tuft, instead of only a single one, a character that Budde-Lund considered of considerable weight in the classification of this subfamily. As noted by Pearse, the new genus appears to be related to *Sphaeroniscus* Gerstaecker, 1881, and to *Spherarmadillo* Richardson, 1907,

from Guatemala (see Proc. U. S. Nat. Mus., XXXII, p. 447), but these have the second antenna with a flagellum of three articles. *Haplarmadillo* Dollfus, from St. Vincent, W. I., (Proc. Zool. Soc. London, ann. 1896, p. 400), is apparently also allied; this, however, has the flagellum of the second antenna, though rather long, composed of but one article. *Paracubaris* Collinge, 1918, also established for a British Guiana species, *P. spinosus*, does not appear sufficiently distinct, and his species should probably be placed in *Circoniscus* with the present one.

*Philoscia nitida* (Miers), 1877.

*Philougria nitida* Miers, 1877, *Proc. Zool. Soc. London*, ann. 1877, p. 670, pl. LXIX, fig. 3.

*Philoscia nitida* Budde-Lund, 1885, *Crust. Isop. Terr.*, p. 222; 1893, *Entom. Meddel.*, ann. 1893, p. 122 (mentioned for comparison); 1906, *Voeltzkow, Reise in Ostafrika*, II, p. 289; Pearse, 1915, *Proc. U. S. Nat. Mus.*, XLIX, pp. 532, 534, 542.

(Plates XIX-XX, figs. 52-59 incl.)

General outline of body elliptical, in a dorsal view rather wide (width often exceeding .4 of the length of body and head); the back well arched; the head and abdomen very small. Body surface very smooth and shining, though bearing a few scattered setose hairs. These are more numerous on the antennae, pleopoda, and a few other parts. Lateral ends of thoracic segments with a very narrow slightly thickened border, but this is not conspicuous.

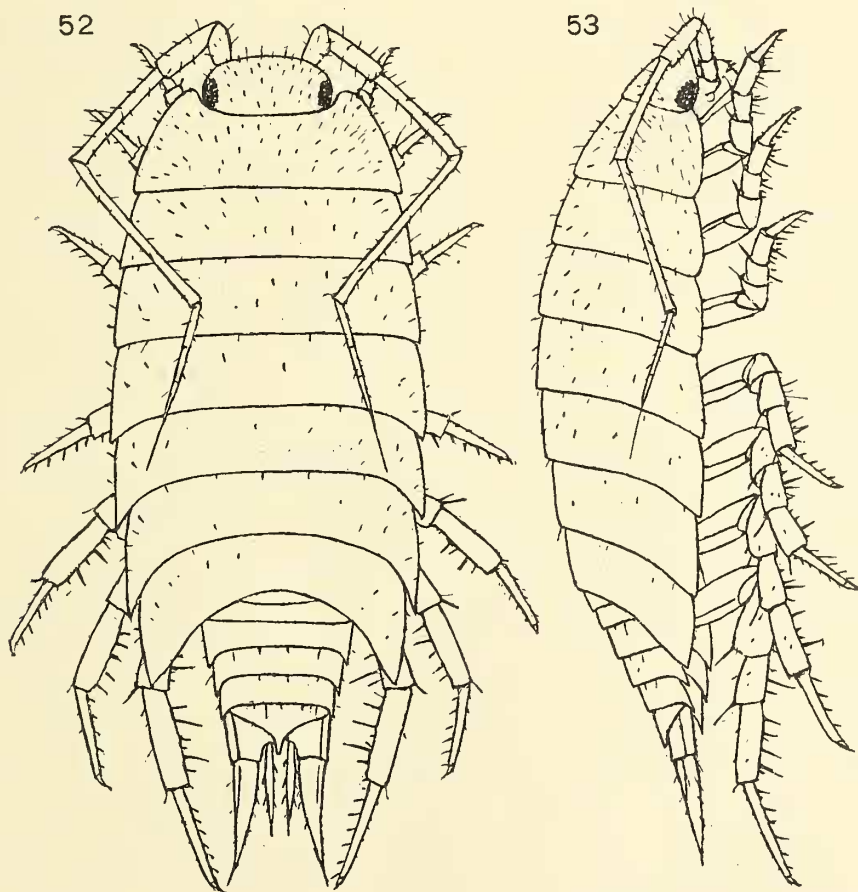


Plate XIX.—52-53, *Philoscia nitida* (Miers), 1877. Female  $\times 7$ .

Coloration rather conspicuous; in addition to the usual irregular light markings on the dorso-lateral regions and on the head, the purplish brown ground color of the back is variegated by a darker stripe on each side in the region of the bases of the thoracic epimera; in this stripe there is on each segment a large, conspicuous, more or less irregularly oblong light (unpigmented) spot; there is also a median series of light spots which in some individuals lie in a darker median stripe. On the thoracic epimera the purplish pigment fades out so that the thorax seems to be bordered by a broad, somewhat lighter stripe outside the dark lateral stripe in which the large spots lie. Abdomen and telson mostly purplish brown, though median lighter spots are present and the projecting angles of the segments are not pigmented. The external branches of the uropoda are dark but crossed by a broad light band at the middle. The largest specimens from Kartabo do not much exceed 9 mm. in length, but the collections of the American Museum contain females up to 11.5 mm. and males up to 11.2 mm. in length from other British Guiana localities.

Head small and narrow, not very deeply set back into the thorax. Seen from above, its front outline is smoothly convex without a suggestion of lobes. Seen from one side or in front, the forehead slopes down to form a prominent though somewhat rounded-off horizontal border extending across between the eyes, below which the head is abruptly much contracted. The mouth parts form a downwardly and somewhat forwardly projecting mass of smaller proportionate size than in many other members of the genus. Eyes obliquely oval with 16 to 19 ocelli.

Second antennae of considerable length but quite slender, especially the last joint of the peduncle and the flagellum, which bears a long terminal bristle. Their length is subject to much individual variation. When strongly drawn back, the tip of the terminal bristle can reach nearly or quite to the abdomen in some individuals, in others hardly more than to the fifth segment of the thorax. The first of the three articles of the flagellum somewhat exceeds in length either of the other two, that nearly equal each other. This is exclusive of the terminal bristle which may itself exceed half the flagellum in length. The latter is but about two-thirds or less of the length of the last joint of the peduncle.

The thoracic segments all have the posterior lateral angles extended backward and in an increasing degree from only very slightly in the first to very greatly in the sixth; in the seventh a little less than in the sixth. These angles are a little rounded off in segments I and II, but usually not so much in segment III; the extreme tip is either acute or very slightly rounded in IV; the posterior segments have the angles acute. The legs have only moderately well developed spines. The three anterior pairs of legs are rather short and weak, legs IV to VI are successively longer, while the seventh pair are considerably longer and stouter than any of the others, so that we may credit the animal with probably having some power of jumping. The claws of the dactyli are small, especially in the posterior legs. The legs are similar in the two sexes. The abdominal segments 3 to 5 have the posterior lateral angles extended into narrow, sharp points directed straight backward. The telson is wider than long, of somewhat triangular outline with the sides very slightly sinuously or concavely curved and a not very sharp though slightly acuminate tip. The basal joints of the uropoda are rather long, exceeding the tip of the telson, and are conspic-

uously furrowed on their external aspect. Their external branch is quite long and sharply tapering or subulate, little flattened, though slightly furrowed on the external aspect. The inner branches are quite slender, somewhat compressed from side to side and scarcely reach half way along the outer ones. They are inserted considerably forward of the end of the basal joint.

The collection contains five specimens. The one figured (a female) and a male specimen bear the collector's number 201146 and were found in dead wood. Another female (collector's number 24833) was found under the bark of a dead tree, while a male and a female are without collector's notes.

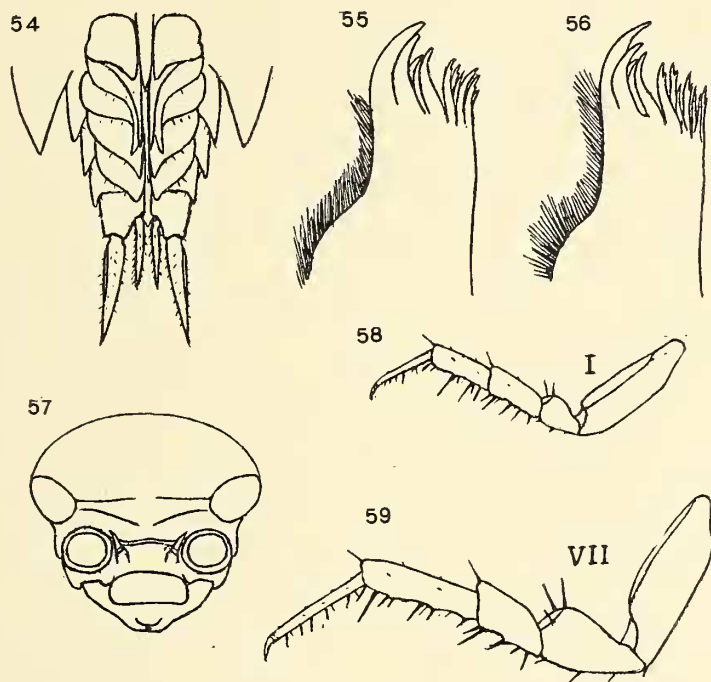


Plate XX.—*Philoscia nitida* (Miers), 1877; 54, ventral aspect of abdomen of male  $\times 5$ ; 55 and 56, tip of outer division of first maxilla of two individuals  $\times 75$  and  $62$  respectively; 57, front of head  $\times 12$ ; 58 and 59, first and seventh legs  $\times 10$ .

I refer these specimens to Miers' *P. nitida* with much hesitation, their correspondence with the insufficient descriptions and figures that have been published, being none too satisfactory. The types or at least original specimens of Miers were examined in the Warsaw Musum by Budde-Lund and are presumably still to be seen there, so that the latter author cannot have made any mistake in identification. They came from "Peru and Guiana," according to Miers. He says "the specimens from Guiana generally appear rather more coarsely granulated," while Budde-Lund says of the species, "nitidissima, glabra, vix vel minutissime et sparsissime punctata." The Kartabo specimens would be better described as extremely smooth; only under high magnification does the surface exhibit a very minute, even granulation suggesting very fine sandpaper, and too fine to interfere with the glossy appearance of the animal when seen without much magnification or with none at all. Budde-Lund (1906, p. 289) makes *P. nitida* the type of a subgenus *Hesca* which he does not define, but which he says shows affinity to *Sphaeroniscus*.

Pearse, 1915, who gives no description or figure, records *Philoscia nitida* as an abundant species in the Santa Marta, Colombia region from La Rosa (altitude low) to the top of Mt. San Lorenzo (8500 feet), and sometimes occurring in the water of the mountain streams as well as in damp places on land in the forest. If he is really dealing with the same species as Miers and Budde-Lund, *P. nitida* must be widely distributed in South America, increasing the probability that I am correct in referring the Kartabo specimens to it. I may add that the American Museum of Natural History has specimens identical with those from Kartabo from various other British Guiana localities.

*Philoscia maculata* Budde-Lund, 1885.

*Philoscia maculata* Budde-Lund, 1879, *Prosp. Crust. Isop. Terr.*, p. 2 (nomen nudum); 1885, *Crust. Isop. Terr.*, p. 215 (description); Kraepelin, 1901, *Mitt. Naturh. Mus. Hamburg*, XVIII, p. 204; Budde-Lund, 1906, *Voeltzkow, Reise in Ostafrika*, II, p. 287.

(Plates XXI-XXII, figs. 60-63 incl.)

Three specimens in the collection from Kartabo, all females, the largest of them little over 5 mm. long, represent a species evidently very close to this form described by Budde-Lund, though his description, which is unaccompanied by any figure, is insufficient to allow of my assigning these specimens to it except provisionally; since reexamination of that author's material might disclose differences precluding such identification.

The collection of the American Museum contains other specimens of both sexes apparently identical with those from Kartabo from other British Guiana localities. Some of these measure between 6 and 7 mm. long.

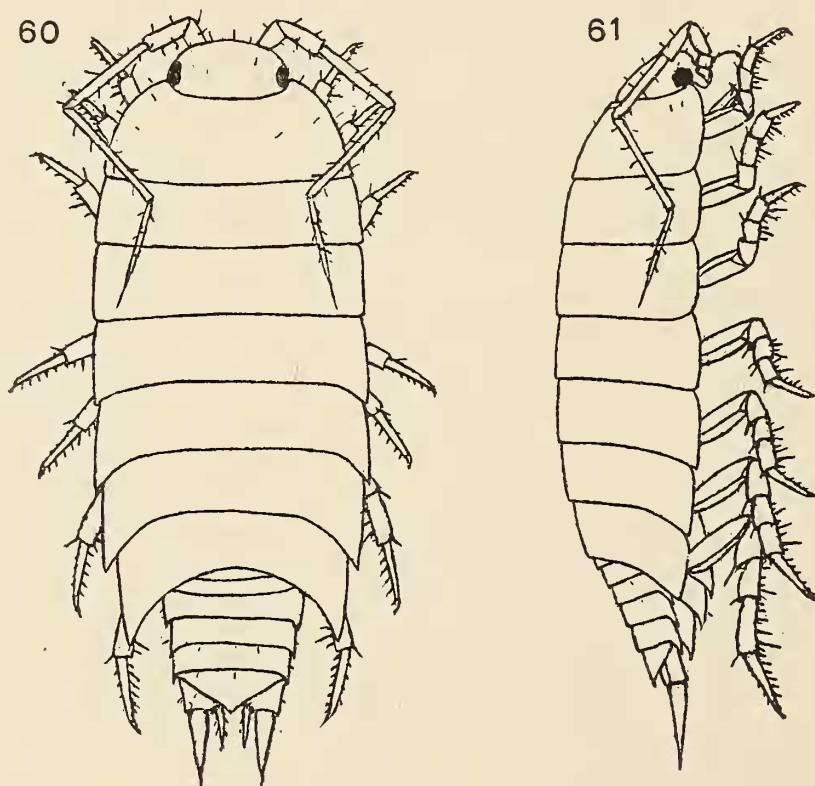


Plate XXI.—60-61, *Philoscia maculata* Budde-Lund, 1885. Female  $\times 12$ .

In a dorsal view the body is of oblong-elliptical outline and broadly rounded in front, the head being small and narrow, and considerably set back into the thorax, and the abdomen rather small and short. Body surface very smooth and for the most part free from any setose hairs, though a few are present on the head, antennae, uropoda, etc. Color purplish brown above, with numerous small irregular light (unpigmented) bars and spots on the dorso-lateral regions and head as usual in the genus, but in addition there is a row of large, somewhat square, light spots on the lateral part of the thorax on each side, at the junction of the epimeral with the main part of the segment. Very obscurely indicated darker median and lateral longitudinal stripes are sometimes discernible. The under parts are mostly unpigmented, though there is some of the purplish brown pigment on the maxillipeds, thighs, pleopoda and some other parts.

When seen directly from above, the front outline of the head appears convex and smoothly curved with no indications of lateral lobes. In a more or less anterior view it appears somewhat sinuous. The eyes are rather large and unusually round; they are well pigmented and have a dozen or more ocelli well developed. Antennae of moderate length, usually reaching, when strongly drawn back, the fifth thoracic segment. Flagellum (exclusive of its terminal bristle) considerably shorter than the fifth segment of the peduncle; the first of its three articles very slightly exceeds either of the other two, which do not differ greatly in length.

The first three thoracic segments have the posterior lateral angles rounded and not at all extended backward. The fourth has the angle nearly sharp, in

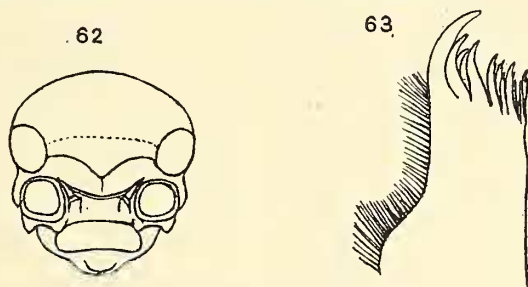


Plate XXII.—*Philoscia maculata* Budde-Lund, 1885; 62, front of head  $\times 18$ ; 63, tip of outer division of first maxilliped  $\times 100$ .

the remaining three it is actually so. Beginning (very slightly) with the fourth, the remaining thoracic segments have the posterior lateral angles extended back to an increasing extent. Legs only moderately long, increasing considerably in length toward the rear of the body. No sexual differences in the legs were discovered.

Abdomen rather small and tapering. The third, fourth and fifth segments have the posterior lateral angles extended back into small appressed triangular points. Telson broadly triangular with a fairly sharp apex and nearly straight (in some individuals somewhat sinuously curved) sides. Basal joints of uropoda and outer branches of same with a furrow on the external aspect; the basal joints extend about as far as the tip of the telson. Outer branches are short and taper rapidly, and are tipped by a short bristle, which, however, is not always present. The inner branches are small and compressed from side to side.

The Kartabo specimens were obtained by sifting in the jungle.

Budde-Lund described *P. maculata* from South America, "ad 'St. Nicolas' ad 'Barodero' prope 'Riacho del Oro,'" being the localities given by its describer, who was perhaps as unsuccessful in locating them on the map as I have been. He states that the types are in the Copenhagen Museum. The same species was subsequently found by Kraepelin on orchids imported into Hamburg from Brazil, the specimens being identified by Budde-Lund.

In discussing the character and divisions of the genus *Philoscia*, Budde-Lund (in Voeltzkow, Reise in Ostafrika, II, p. 289), mentions *P. maculata* as one of several species which he places in a new subgenus *Balloniscus*, whose characters, however, he does not mention except to state that the pleopoda are well provided with tracheae. I cannot regard this as a satisfactory or sufficient basis for distinguishing a subgenus.

***Philoscia demerarae*, sp. nov.**

(Plate XXIII, figs. 64-66 incl.)

A single female 4.5 mm. long represents this small species in the collection. It has a well developed and somewhat distended marsupium but this is entirely empty.

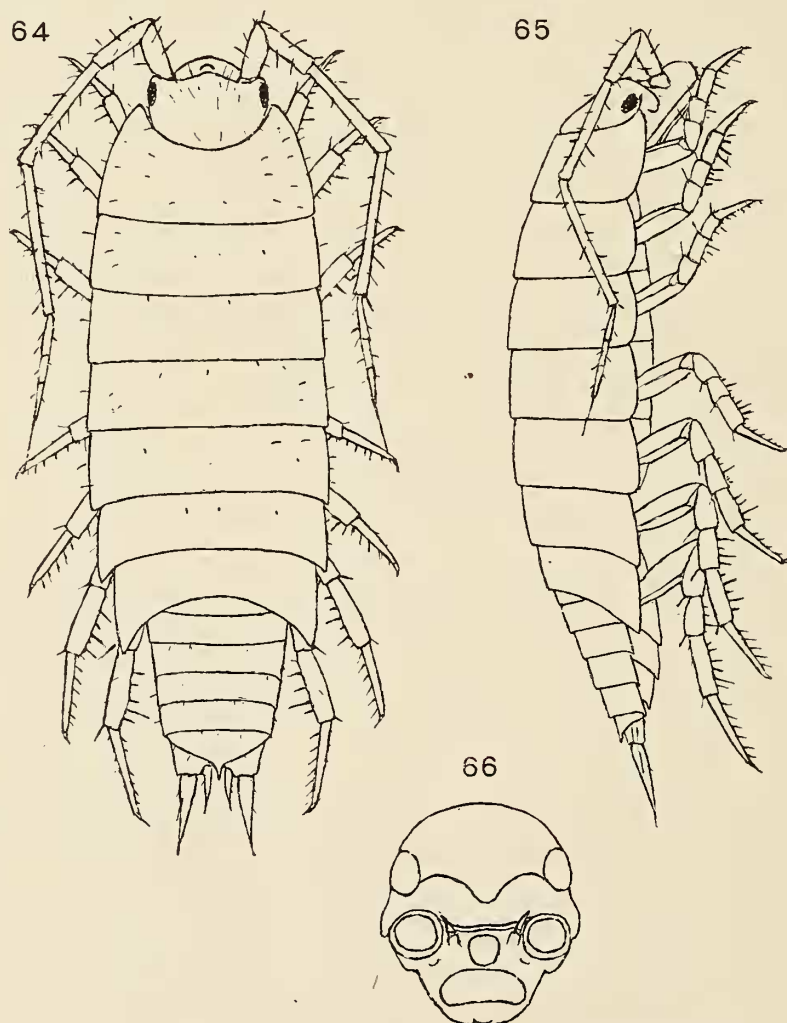


Plate XXIII.—*Philoscia demerarae*, sp. nov.; 64 and 65, female  $\times 14$ ; 66, front of head  $\times 23$ .

The body is proportionately rather narrow and of elongate elliptical outline when seen from above, the abdomen rather large and long and not very greatly narrower at its anterior end than the last segment of the thorax.

Articulation rather loose, cuticle soft and of tender consistency, making the actual form and proportions of the parts difficult to determine. Surface of body fairly smooth, only a few setose hairs are present on most parts of the body and limbs, except on the antennae, where they are fairly numerous. Color pale purplish brown above with small light (unpigmented) spots on the head and a few larger oval, rounded, or somewhat irregular ones on the dorso-lateral regions of the back. The lower parts and limbs bear a little of the purplish pigment in some places.

Head rounded behind and set well back into the thorax. Seen from above its front outline is sinuous or somewhat three-lobed; the lateral lobes, situated under the eyes, are rounded but extend downward much more than forward or laterally. The most forwardly prominent part of the forehead forms a not very definitely indicated line which, when seen from in front, dips down in the median region in a V-shaped angle. Directly below the angle and between the minute first antennae there is an oval tubercle. The head is not narrowed below the level of the eyes, and the mouth parts form a large mass which projects obliquely downward and farther forward than the anterior margin of the forehead, so that its anterior part shows in a dorsal view of the body. Eyes well pigmented but with rather few ocelli, about ten being well formed. Second antennae quite long, reaching to the sixth thoracic segment when strongly drawn back. The flagellum, exclusive of a rather long terminal bristle, is considerably shorter than the last segment of the peduncle. Its first article is the longest, the second somewhat the shortest (the terminal bristle not being included).

First five thoracic segments with the posterior lateral angles rounded off; the sixth and seventh have them sharp. Only fifth (to a slight extent), sixth and seventh have this angle extended back. Legs long with fairly long and strong spines.

Abdomen only moderately tapered. The posterior angles of segments three, four and five are only extended into insignificantly small, appressed points which are hardly noticeable in a dorsal view. Telson wide and short, its sides slightly sinuously curved and its apex strongly acuminate. The basal segments of the uropoda, as well as the external branch of the same, has a furrow on the external aspect. The basal segment is short, not exceeding the tip of the telson; the branches are also short and rapidly tapered, bearing short bristles at their tips.

The type and only specimen was collected in the jungle at Kartabo by sifting. While a full description of the species must await the collection of more material, it seems quite distinct from the other two species here described, and I have been unable to identify it with any previously described form. No collector's number or notes accompany the specimen.

#### Family LIGYDIDAE

##### *Ligyda platycephala*, sp. nov

(Plate XXIV, figs. 67-71 incl.)

This species resembles the well known and widely distributed *L. exotica*

(Roux) 1828, of the sea coasts of most tropical countries, in the soft, weakly articulated body and the posteriorly tapering outline of the same when seen from above, but it has the abdomen proportionately even smaller than in *L. exotica*, though the thorax is more oblong and less oval in outline.

It will suffice to mention the remaining differences between this species and *L. exotica*. If we may judge by the specimens available, it is considerably smaller; the largest one (a female with well developed marsupial plates bearing a considerable number of rather large eggs or embryos) is a little less than 18 mm. long. The largest male is about 16.5 mm. long. The colors are brighter and more variegated, though due to similar minute irregularly stellate or

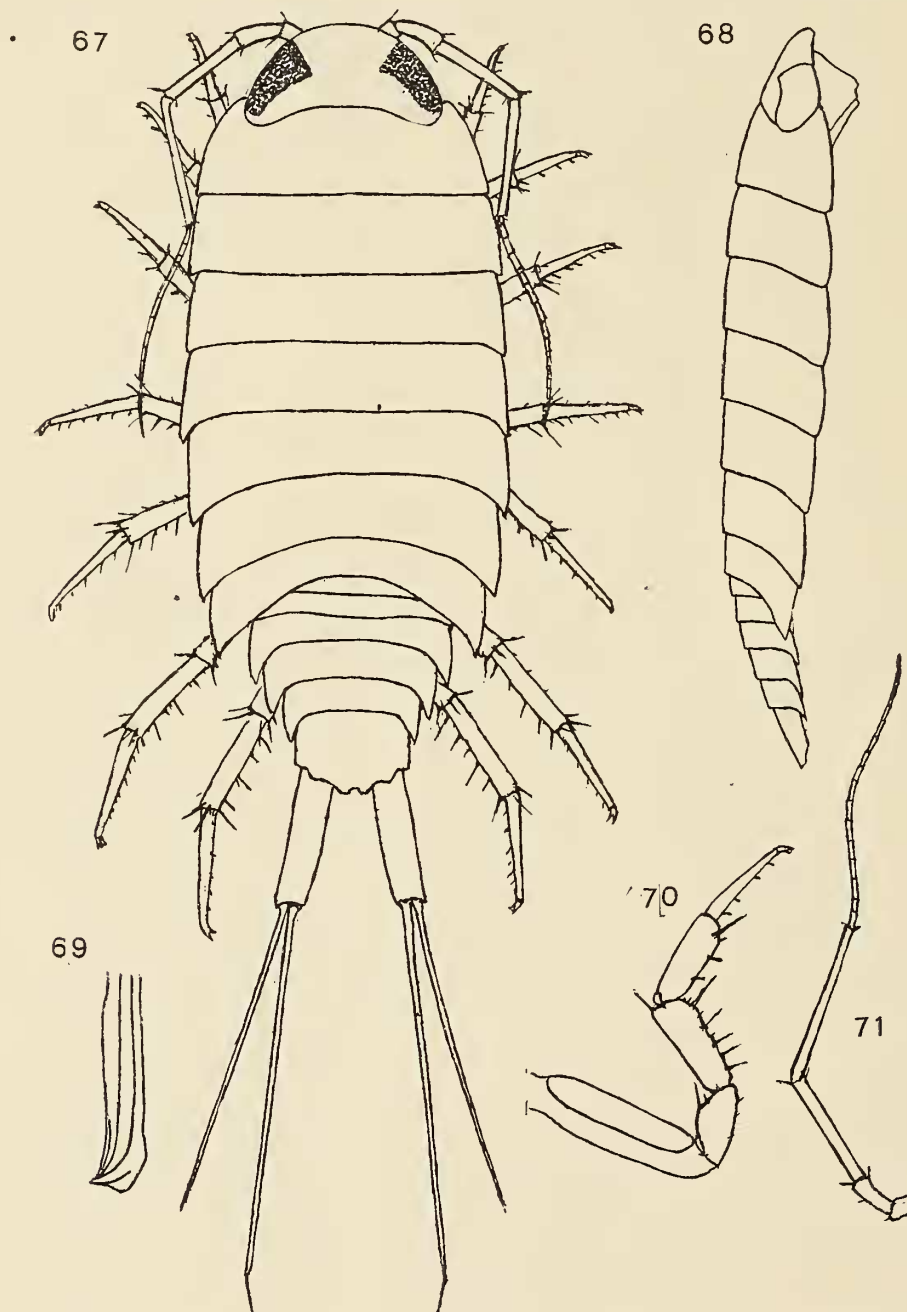


Plate XXIV.—*Ligyda platycephala*, sp. nov.; 67, female  $\times 4.5$ ; 68, side view of body of same  $\times 4.5$ ; 69, tip of styloid appendage of pleopod of male  $\times 14$ ; 70, first leg of male  $\times 9$ ; 71, second antenna of male  $\times 5.6$ .

branching blackish pigment spots on a yellowish ground color. They are however so distributed in the present species as to form a distinct, broad, blackish median stripe on both the thorax and abdomen, and on the thorax also a series of large, somewhat rectangular obliquely placed blackish spots at the junction of the epimeral portion of the segments with the main portion. These give the appearance of lateral longitudinal dark stripes when not too closely inspected; between these lateral and the median stripes there are on each side one or two small transverse dark markings on the rear edges of the thoracic segments. Elsewhere on the upper parts, as well as below and on the legs, the minute pigment spots are more thinly scattered and do not much obscure the strongly yellowish ground color. The body surface is very smooth, exhibiting no granulation or minute tuberculation on magnification.

The head is much longer and is rather flattened, exhibiting in a dorsal view a strongly convex anterior border and a concave posterior border that is considerably set back into the thorax. The eyes are more elongate and much less bulging. The second antennae are shorter than in *L. exotica*. They are longer in the male specimens where they reach to or even a very little way along the abdomen when well drawn back, than in the females, where they can only reach the sixth or seventh thoracic segment. (The male specimens have 16 or 17 articles on the flagellum, the females 15 or 16, but the male has the peduncular part more elongated than the female).

The thoracic segments differ from those of *L. exotica* in having the epimera smaller and completely fused with the main portion in both sexes. Their posterior corners are angular; the last three sharply so; the others a trifle rounded at the apex. The legs are long and well developed. No sexual differences were found in the structure of the first leg (fig. 70 would represent the first leg of either sex) which much resembles that of the female *exotica*.

This species differs greatly from *L. exotica* in the peculiar outline of the rear end of the telson. It lacks the backwardly directed points at the lateral corners and on the median line; the former are merely bluntly angular, and at the median line there is a small notch between two small obtuse projections.

The styloid appendages of the pleopoda of the male are very straight and slender and reach nearly to the end of the telson. Each process has a broad shallow groove along its ventral aspect. As the tip is approached the sides of the groove draw together, and curving toward the median side join to form a short obliquely projecting claw-like point (fig. 69). In the female the uropoda, inclusive of the inner branch, which is the longest, project beyond the telson a distance about equal to two-thirds the length of the body and head; this measurement is exclusive of a fairly long movable spine or bristle borne on the end of the inner branch. In the male the uropoda are proportionately a little longer than in the female.

Seven specimens of this species are included in the collection. The type, a female 15.4 mm. long, and one male specimen are recorded as found in a damp forest; two others (collector's number 201146) as "land isopods from dead wood" the others simply as "land isopods" or without data.

*Ligyda richardsonae* Pearse, 1915 (Proc. U. S. Nat. Mus. XLIX, p. 549, fig. 9) from the Sierra Nevada of Santa Marta, Colombia, resembles this species in its forest habitat (though this is at a high altitude, 3800 feet) and in many

72

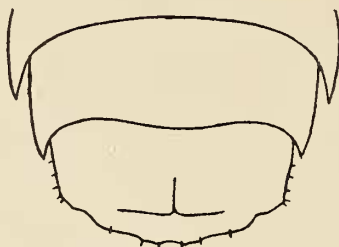


Plate XXV.—*Ligyda richardsonae* Pearse, 1915; 72, outline of rear end of abdomen (dorsal) view. Sketch by Mr. C. R. Shoemaker from cotype in U. S. Nat. Museum. Introduced for comparison.

important characters. Several discrepancies however stand in the way of referring these specimens to his species, notably the fact that the rear border of the telson in his species is rather evenly arcuate with only very slight indications of the distinct toothing and notching of the present form. A sketch drawn from a cotype of Pearse's species in the U. S. National Museum, kindly made for me by Mr. C. R. Shoemaker of that institution, confirms the existence of a marked difference in this respect. It is reproduced in Plate XXV, fig. 72 of this article.

#### SUPPLEMENT

Additional species of family ONISCIDAE.

***Pentoniscus exilis***, sp. nov.

(Plate XXVI, figs. 73–77 incl.)

The single specimen in the collection is far from being adequate for a study of this species, whose minute size and delicacy of structure place unusual difficulties in the way of properly describing and illustrating it.

The individual is a female without a well developed marsupium. It measures only 1.95 mm. long in a nearly straightened position of the body and while perhaps not fully grown, the fairly deep pigmentation and general characters of the specimen do not indicate any great degree of immaturity, and the species is evidently an exceedingly minute one.

The body is rather elongate, more so actually than appears to be the case, as the epimeral parts of the segments are considerably developed, increasing its apparent width. Its surface is covered with small tubercles arranged on most of the thoracic segments in two rows, the anterior row being irregular and consisting of about twelve larger tubercles; the posterior row (situated along the rear margin) contains about seventeen tubercles. On the first thoracic segment the tubercles form three (on the lateral parts four) rows, and on the head the tubercles are smaller and quite numerous. The upper parts of the specimen are brown with small light markings; the lower parts and legs are unpigmented.

The head is fairly large and wide and somewhat set back into the thorax. The eyes are well pigmented, but the ocelli are rather indistinct, so that their number, which is evidently small, is difficult to determine. The mouth parts project prominently, not only downward but in a forward direction. The

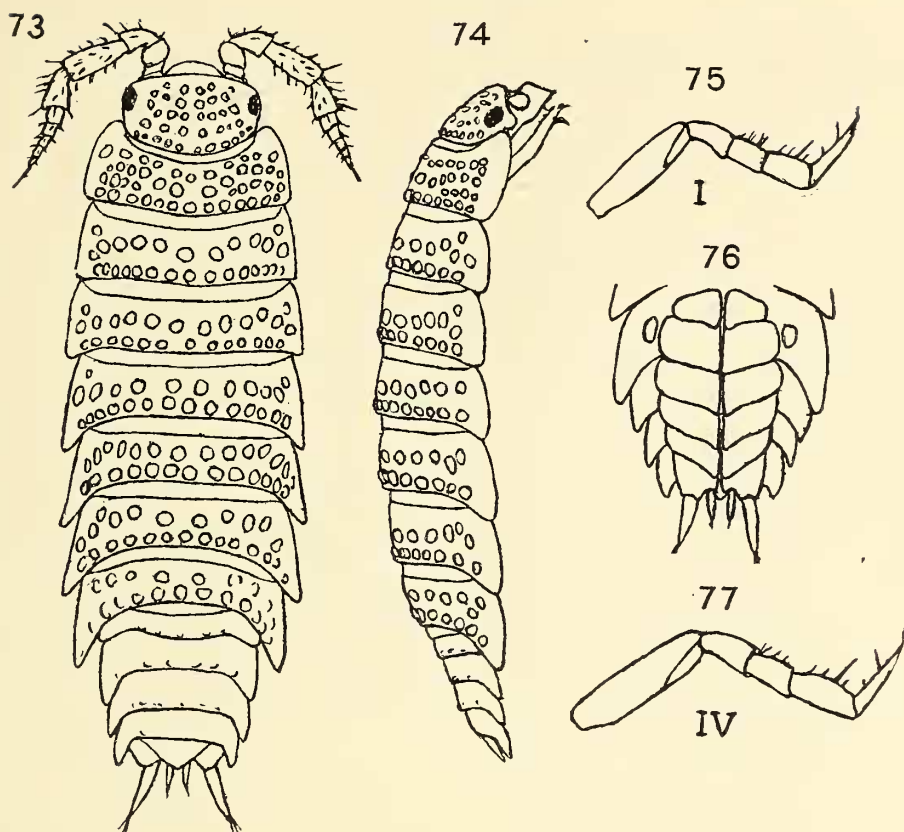


Plate XXVI.—*Pentoniscus exilis*, sp. nov. 73 and 74, female  $\times 34$ ; 75, first leg of female  $\times 56$ ; 76, lower aspect of abdomen of female  $\times 34$ ; 77, fourth leg of female  $\times 56$ .

second antennae are large, reaching well along the second segment of the thorax, and are covered with short stiff hairs. The segments of the peduncle are rather short and fairly stout, the flagellum is tapering and consists of five segments, decreasing in diameter, the last one bearing a very stout though rather short terminal bristle.

The posterior lateral angles of the thoracic segments are extended back to a successively increasing extent, but the apices of the angles are in no case actually sharp. The specimen lacks some of the legs; none of the last three pairs are preserved, but those of the anterior four pairs that are present show them to be rather long and provided with but few spines. The abdomen forms about one-quarter of the total length and is considerably narrower than the thorax. Its third, fourth and fifth segments have the posterior lateral angles considerably extended backwards. The telson is small, triangular, and somewhat wider than long; its apex hardly projects farther back than the produced angles of the fifth abdominal segment. The basal joint of the uropoda is large and wide; the branches are terete, tapering, and proportionately small (the inner ones especially so), and bear short, terminal hairs.

The only specimen bears no collector's number, but according to the label was collected by sifting in the jungle.

## BIBLIOGRAPHY

## Works recording Isopods from British Guiana

BOONE, P. L.

1918. Descriptions of ten new Isopods. Proc. U. S. Nat. Mus., LIV, pp. 591-604, Pls. LXXXIX-XCII.

BRANDT, J. F.

1833. Conspectus Monographiae Crustaceorum Oniscodorum Latreillei. Bull. Soc. Imp. Nat. Moscou, VI, pp. 171-193.

BUDDE-LUND, G.

1879. Prospectus generum specierumque Crustaceorum Isopodum Terrestrium. Copenhagen.
1885. Crustacea Isopoda Terrestria per familias et genera et species descripta. Hauniae, pp. 1-319.
1893. Land Isopoder fra Venezuela indsamlede af Dr. Fr. Meinert. Entom. Meddel., 1893, pp. 111-129.
1899. A revision of Crustacea Isopoda Terrestria with additions and illustrations. Pt. I. Eubelum. Ent. Meddel., (2) I, pp. 69-97. Pls. I-V. (Also published separate, paged 1-31.)
1904. Same, Pt. II, Spherilloninae. Pt. III, Armadillo. Copenhagen, pp. 33-144, pls. VI-X.

COLLINGE, W. E.

1918. Description of *Paracubaris spinosus*, a new genus and species of Terrestrial Isopod from British Guiana. Journ. Linn. Soc. London, Zool., XXXIV, pp. 61-63, pl. VI.
1922. On the Terrestrial Isopod *Eluma caelatum* (Miers) = *purpurascens* Budde-Lund, Journ. Linn. Soc. London, Zool., XXXV, pp. 103-106, pl. VIII.

DOLLFUS, A.

1889. Sur quelques Isopodes du musée de Leyde. Notes Leyden Mus., XI, pp. 91-94, pl. V.
1896. Sur la distribution géographique des Armadilliens en Europe. C.-R. 3me Congrès Internat. Zool. Leyde, pp. 356-358.

KOCH, C. L.

1847. System der Myriapoden, mit den Verzeichnissen und Berichtigungen zu Deutschlands Crustaceen, Myriapoden und Arachniden. pp. 1-272, pls. I-X. Regensburg.

MIERS, E. J.

1877. On a collection of Crustacea, Decapado and Isopoda, chiefly from South America, with descriptions of new Genera and Species. Proc. Zool. Soc. London, ann. 1877, pp. 653-679, pls. LXVI-LXIX.

MILNE EDWARDS, A.

1840. Histoire Naturelle des Crustacés. Isopods in Vol. III, pp. 115-283, pls. XXXI-XXXIII. Paris.

PEARSE, A. S.

1917. Isopoda collected by the Bryant Walker Expedition to British Guiana with notes on Crustacea from other localities. Occ. Papers Mus. Zool. Univ. Michigan, No. 46, pp. 1-8, figs. 1-3.

RICHARDSON, H.

1901. Key to the Isopods of the Atlantic Coast of North America, with descriptions of new and little known species. Proc. U. S. Nat. Mus., XXIII, pp. 493-579, figs. 1-34.

1905. A Monograph of the Isopods of North America. Bull. 54, U. S. Nat. Mus., pp. i-liii, 1-727, figs. 1-740.

SCHIOEDTE, J. C. AND MEINERT, F.

1879-1884. Symbolae ad Monographiam Cymothoarum, Crustaceorum Isopodum Familiae. Naturhist. Tidsskr. (3), XII, 1879-1880, pp. 321-414, pls. VII-XIII; XIII, 1881-1883, pp. 1-166, 281-378, pls. I-XVI; XIV, 1884, pp. 221-454, pls. VI-XVIII.

STUXBERG, A.

1875. Om Nord-Americas Oniscider. Öfversigt af kong. svensks. Vetensk.-Akad. Förh., XXXII, No. 2, pp. 43-63.

The following are important articles on the isopods of Venezuela and Colombia:

DOLLFUS, A.

1893. Voyage de M. E. Simon au Venezuela. 22d Mém., Isopodes Terrestres. Ann. Soc. Ent. France, LXII, pp. 339-345, 2 pls., 1 text-fig.

PEARSE, A. S.

1915. An Account of the Crustacea collected by the Walker Expedition to Santa Marta, Colombia. Proc. U. S. Nat. Mus., XLIX, pp. 531-555, figs. 1-9, pls. LXX-LXXIII.